COST AND INFORMATION EFFECTIVENESS ANALYSIS: AN IMPROVED METHODOLOGY VOLUME II

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for

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TRAINING RESEARCH LABORATORY
Seward Smith, Acting Director





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20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report is the second of two volumes that present results of an effort to develop an improved methodology for the conduct of Cost and Information Effectiveness Analysis (CIEA). CIEA is a methodology for the evaluation of training device performance assessment capabilities (D-PACs). It is directed at the problem of determining when the worth of performance status information available from a D-PAC offsets the costs required to develop, operate, and maintain the capability. (Cont'd)

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This report presents a case study which illustrates application of CIEA to evaluate a series of D-PAC alternatives that provide performance status information on the gunnery proficiency of crews for the Combat Engineer Vehicle (CEV). CEV gunnery D-PAC alternatives were developed by combining members of a set of interactive video gunnery trainers for the CEV with different types of live fire exercises. The case study describes activities conducted in the four phases of the CIEA of CEV gunnery D-PACs: exploration of the D-PAC concept for CEV gunnery, development of the D-PAC concept for CEV gunnery, definition of the CEV gunnery D-PAC alternatives, and evaluation of CEV gunnery D-PAC alternatives. Activities of the last phase culminate with specification of the most cost-effective CEV gunnery D-PAC alternative.

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- APPENDIX C. OPERATIONAL SEQUENCE DIAGRAMS FOR CEV GUNNERY
- APPENDIX D. D-PAC COSTING GUIDE

APPENDIX A

HIERARCHICAL ROLLBACK PROCEDURES

FOR DERIVING NORMALIZED

UTILITY AND IMPORTANCE SCORES

This appendix describes how utility values or importance weights are derived for items organized hierarchically. Figure A-l illustrates the process for a hierarchy of hypothetical tasks, subtasks and skills. In Figure A-l, the ultimate objective is to compute a set of normalized utility scores for the skills. Utility scores will be derived based on ratings provided by SMEs. In CIEA, ratings are obtained using a rank and rate method in which SMEs first rank items in terms of utility or importance and then assign ratings that reflect the distance between items. Thus, the procedure calls for comparisons between items. When the number of items to be rated is large (greater than 10) it is difficult for SMEs to make comparisons between items. A hierarchy is used to organize the items into small groups within which comparison is relatively easy.

When a hierarchy is employed, the derivation of utilities requires that items in each level of the hierarchy be ranked and rated. The ratings at each level are scaled and the scaled values are "rolled back" through the hierarchy to yield utility scores for the terminal items in the hierarchy (skills in Figure A-1). Referring to Figure A-1, the normalized scores for the skills were derived by first rating items in each level of the hierarchy using a 0-100 scale. Next, the rated values were divided by 100. Then, values were multiplied across (or down) the hierarchy of tasks, subtasks, and skills until there was a single value for each skill. When all the skill values were determined, the set of all skill values was normalized by totaling the set of values and dividing each value by the total.

An alternative to the above process would be to normalize items at a given level to 1.0 and roll the normalized values through the hierarchy. The same normalized utility scores of the skills would result, but the summing of uncorrected utility scores and dividing each uncorrected score by the sum to yield a normalized score would not be required. Derivation of normalized scores at each level of the hierarchy would require that the ratings of a

set of items be summed and the rating of each item be divided by the resulting sum. The sum of the normalized scores of a set of items would be one. When the normalized values of items are rolled back through the hierarchy, the resulting utility scores of the skills will sum to 1.0 also. Either procedure is equally effective. Choice of a procedure depends on user preference.

Note: When items are not organized hierarchically (e.g., there is less than 10 items) this same procedure is used to derive normalized scores. That is, the ratings are summed and the rating of each item is divided by the sum.

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APPENDIX B

RESULTS OF CEV GUNNERY FRONT-END ANALYSIS (FEA)

CEV GUNNERY TASKS

Item	Task #	<u>Title</u>
	CLUSTER	O. PERFORM PREPARE TO FIRE CHECKS SL 1
1.	C1001	Perform Driver prefire checks
2.	C1001	Perform Loader prefire checks
3.	C1002A	Perform Loader prefire checks for main gun
J.	CTOOLK	SL 2
4.	C2001	Perform Gunner prefire checks
5.	C2002	Boresight the 7.62mm coax machine gun M-73
6.	C2003	Boresight the 7.62mm coax machine gun M-240
7.	C2004	Align the infinity sight with 7.62mm coax machine gun
8.	C2005	Zero the 7.62mm coax machine gun
9.	C2006	Boresight the 165mm M-235 main gun
10.	C3001	Perform tank commander (TC) prefire checks
11.	C3001A	Perform tank command (TC) prefire checks for main gun
12.	C3002	Boresight the caliber .50 M-85 machine gun
13.	C3003	Zero the caliber .50 M-85 machine gun
13.	03003	beto the current room of machine gain
	CLUSTE	R 1. PERFORM AMMUNITION HANDLING SL 1
14.	C1101	Perform Loader misfire procedures for main gun
15.	C1102	Load/stow 165mm main gun ammunition
16.	C1103	Load the M-135 main gun
17.	C1104	Load/stow basic load ammunition
18.	C1105	Load the 7.62mm coax machine gun M-240
19.	C1106	Load the 7-62mm coax machine gun M-73
20.	C1107	Apply immediate action to reduce a stoppage in the
20.	0110 ,	7.62mm coax machine gun
21	C2101	SL 2
21.	C2101	Perform Gunner misfire procedures for main gun SL 3
22.	C3101	Load the caliber .50 M-85 machine gun
23.	C3102	Correct a stoppage of the caliber .50 M-85 machine
		gun using immediate action
	CLUST	TER 2. OCCUPY FIRING POSITIONS
	CLU3	SL 1
24.	C1201	Move into firing positions SL 2
25.	C2201	Prepare a circular range card SL 3
26.	C3201	Prepare range cards
27.	C3202	Select firing positions
28.	C3203	Direct movement into a firing position
	22-03	Direct movement theo a liting pooleron

CEV GUNNERY TASKS (Cont'd)

Item	Task #	<u>Title</u>
		CLUSTER 3. ENGAGE TARGETS SL 1
29.	C1301	Respond to a firing command as Loader or driver
30.	C1302	Detect and identify targets
31.	C1303	Operate CEV during 7.62mm coax machine gun target engagement
32.	C1304	Engage targets with 7.62mm coax machine gun as loader
		SL 2
33.	C2301	Respond to a firing command as Gunner
34.	C2302	Engage targets during limited visibility as Gunner
35.	C2303	Illuminate targets with searchlight as Gunner
36.	C2304	Determine target range
37.	C2305	Engage stationary targets with main gun using burst-on-target (BOT)
38.	C2306	Engage targets with main gun using rapid sequential round as Gunner
39.	C2307	Engage targets with 7.62mm coax machine gun as Gunner
		SL 3
40.	C3301	Issue a firing command
41.	C3302	Engage targets during limited visibility as TC
42.	C3303	Illuminate targets with search light as TC
43.	C3304	Engage targets with main gun using rapid sequential round as TC
44.	C3305	Engage ground targets with caliber .50 M-85 machine gun
45.	C3306	Engage aerial targets with caliber .50 M-85 machine gun
46.	C3307	Engage targets with 7.62mm coax machine gun as TC

12F CEV GUNNERY SKILL LIST

- 001 Recall location and function of switches, controls, and indicators.
- 002 Perform engine start and stop procedures.
- 003 Recall proper cleaning procedures for optical equipment.
- 004 Recall procedures for maintaining proper recoil oil fluid level.
- 005 Recall armament systems damage criteria.
- 006 Operate breechblock operating handle.
- 007 Recall ammunition serviceability criteria.
- 008 Recall that radios must be switched to OFF during engine start.
- 009 Recall firing circuit test procedures.
- 010 Recall ammunition safety cautions and warnings.
- Oll Recall main gun boresighting procedures.
- 012 Recall stowage location of fire control equipment.
- 013 Recall gun control check procedures.
- 014 Operate fire control equipment.
- 015 Install/dismount and stow direct fire sighting equipment.
- 016 Recall misfire procedures.
- Olf Recall that turret lock must be in locked position before removing/ stowing ammunition in hull storage.
- Ol8 Recall that main gun should not be elevated above 178 miles (10 degrees) during loading.
- Ol9 Recall procedure for installing/removing inner and outer rounds in 165mm ready rack.
- 020 Drive CEV in daylight or dark.
- 021 Use military symbols.

12F CEV GUNNERY SKILL LIST (Cont'd)

- 022 Recall the four elements required to plat a target on a range card.
- 023 Identify potential targets.
- 024 Determine target azimuth.
- 025 Use binoculars and WORM formula to estimate range.
- 026 Recall that best source of range is a tank mounted range finder.
- 027 Determine quadrant elevation from Firing Table FT-165-A1.
- O28 Recall that range cards must be prepared for primary, alternate and supplemental firing positions.
- 029 Use map symbols.
- 030 Recall CEV capabilities and limitations.
- 031 Recall site selection criteria for CEV.
- O32 Recall that dangerous targets may require immediate engagement without regard to firing positions.
- 033 Use arm and hand signals to direct vehicle movement.
- 034 Recall elements of a fire command.
- 035 Operate CEV intercom system.
- 036 Operate main gun controls.
- 037 Recall best method of destruction for target types.
- 038 Recall techniques for target detection.
- O39 Recall that CEV's mounting searchlights do not fire while illuminating because of smoke and dust obscuration.
- O40 Recall that CEV's with searchlight mounted should not fire because of possible muzzle blast damage to searchlight.
- 041 Recall techniques for searchlight employment.
- O42 Recall that search light must not be used in overdrive more than once every five minutes.
- 043 Use appropriate sighting equipment for Black light.
- 044 Recall that CEV should move to alternate position as soon as possible.

12F CEV GUNNERY SKILL LIST (Cont'd)

- 045 Operate external radio communications.
- 046 Estimate 100 meter range using football field method.
- O47 Recall criteria for size of range correction in subsequent fire commands (25 meters for measured range, 50 meters for estimated range, doubled if miss is over 100 meters).
- 048 Recall boresighting procedure for Cal .50 machine gun.
- 049 Recall loading procedures for 7.62mm machine gun.
- 050 Recall loading procedures for Cal .50 machine gun.
- O51 Recall assembly/disassembly procedures for the Cal .50 M-85 machine gun.
- 052 Recall target engagement techniques for machine gun engagements.
- 053 Recall boresighting procedures for the 7.62mm coax machine gun.

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JOB TITLE	12 F		DOS CEV Gunnery Tasks	Tasks	
DUTY CODE	O. Perform Prepare to Fire Checks	hecks	LEVEL SL1		
ITEM	16. TASK, ELEMENTS	17. INITIATING CUES	18. CONDITIONS	19. STANDARDS	20. NOTES
C1002	Perform Loader prefire checks	+-+	As loader in a CEV crew	All checks completed in	001 Recall locarion an
j.	Kead the replenisher indi-	MISSION Ordered. TC announces "PREPARE TO	During daylight, prior to initiating combat mission	crew members within 5 min-	functions of switches.
-	cator tape and service as	RIRE".	or training firing.	utes.	
	required				004 Recall procedures
,	because more descriptions		Supervision available	ions and warnings	maintaining proper rec
: 			available	observes.	oil tluid level.
<u>ښ</u>	Check 7.62mm MG mount				005 Recall armament ex
•					damage eritoria
4.	Inspect all turret stowed				
	amminition for proper stowage				006 Operate breechbloc
	complete load and services-				operating handle.
	011119				
•					002 Recall amminition
•	On TC's command, install/				serviceability criteri.
	remove liring circuit rester				
_		,			009 Recall firing circ
•	Assist in t				t est procedures.
	circuit for main gun and				
	7.62mm MG				010 Recall ammunition
<u>'</u>	by Tite agentiand and a				ince
· 	resting				
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88	Inspect all hull stowed ammu-				Sighting procedures
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	Tasks			19. STANDARDS								•														
350-30)	DOS CEV Cunnery Tasks	LEVEL ST.1		18. CONDITIONS																						
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	12 F	O. Perform Prepare to Fire Checks	i i	P. M.	Assist gunner in boresight-	ing main gun		install, remove, and stow breech boresight		Load 7.62mm MG if required	Of a Hundring and to III amount	Report LUADER READY TO IC														
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	C1002A	Perform Loader prefire checks	Combat or training firing	As the	As the Loader in a CEV	П	001 Recall lecation at
	_	tor main gun.	mission ordered	crew		coordination with other	function of switch.
	; _		ITC announces "PREPARE TO	In a s	In a stationary CEV	crew members within 5	controls and indicat.
		tor tape and service as	FIRE"	During	During davlight or night	minutes.	
		required		Prior	Prior to initiating combat		004 Recall procedures
				Missic	on or training firing	Mission or training firing Observe safety warnings	maintaining proper rea
	2.	inspect main gun tube and		Superv	Supervision available		oil fluid level
		chamber, check breech spring		TN 9-2	TH 9-2350-222-10-1 is		
		tension		available	able		005 Recall armament sv
							tems damage criteria
_	<u>.</u>	Inspect ammunition for condi-					
		tion, proper stowage, and					006 Operate breechbloo
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)	-4	Un TC's command, install/					007 Recall ammunition
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_		horesicht					112 Recall stouges loc
_							of fire control equipment
	9.	GUDGIT "LOADER READY" to TC.					
_							113 Recall cun control
							check procedures
	FB Form 115	FB Form 1159c (USAADS) 21 Mar 80		Pre	Previous editions of this form are obsolete.	dete.	30-1343-B3 AFF

1		JOB DATA WORKSHEET (TRADOC Pam 350-30)	350-30)	POS		144 2-1	Page of
12F			-	CEV Gunnery Tasks	ks		
O. Perform	Perform Prepare to Fire Ch	hecks		LEVEL SL2			
16. LASK	TASK, ELENENTS J.P.M.	17. INITIATING CUES	18. CO	CONDITIONS	19. STANDARDS	20.	NOTES
Prepare Gunner Prefire Checks	ner Prefire	Combat or training firing mission ordered	As the	As the Gunner in a CEV crew, in a stationary CEV	All checks completed in	function of	001 Recall location a
		\mathbf{T}	During	During daylight or night	crew members within 5	controls	controls, and indicat
plenisher	Observe Londer's check of re-	FIRE	Prior or fra	Prior to initiating combat minutes or fraining firing	minutes	003 Recal	Old Recall proper cle
			Superv	Supervision available	Observe safety warnings	procedure	procedures for optica
Install, c	Install, clean and inspect		TM 9-2	TN 9-2350-222-10-1 is		equipment	
direct fir	fire sights		present	t			
						009 Recall	firing cir
Check oper	Check operation of ballistic					test procedures	dures
shield							
	- 1					013 Recal	013 Recall gun contro
Check ins	Cheek instrument light and					check procedures	edures
control							
						014 Operat	014 Operate fire cont
On TC's c	On TC's command, test firing					equipment	
control	ontrol circuit in coordina-						
tion wit	tion with 1C and Loader	/	_			011 Recal	011 Recall maingun bo
1						sighting procedures	rocedures
2 .						,	
controls	controls, power pack, oil leve	[6]				015 Instal	015 Install/dismount
בוונו כל מו	Totatol Hydrauire					THE SLOW C	וופרו וווע
with loader						arguering edurament	durbillene
						C2006 Boresight the	Sight the
Check az	Theck azimuth indicator					165mm M-135 maingun	5 maingun
for accuracy	acy						
Check ele	elevation quadrant						
Boresight	oresight maingum, periscope						
and reles	and relescope in coordination						
Lith Leader	r						
C (USAA	FB Form 1159c (USAADS) 21 Mar 80		Previo	Previous editions of this form are obsolete.	blete.	က	30-1393-B3 AF

Page4a of P.			NOTES															30-1393-B3 AFPE
	S		STANDARDS 20.															
	DOS CEV Gunnery Tasks	LEVEL SL2	CONDITIONS 19.															Previous editions of this form are obselets.
JOB DATA WORKSHEET (TRADOC Pam 350-30)		Checks	ITIATING CUES 18.															4
	12F	O. Perform Prepare to Fire (FB Form 1159c (USAADS) 21 Mar 80
	JOB TITLE	DUTY CODE	RELI		•				- 1 ,	 	 						 	 FB Form 1159

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<u> </u>	JOB TITLE	101		DOS		
Įž	TV CORE	15.5		CEV Cunnery Tasks	asks	
3	11000	O. Perform Prepare to Fire Checks	Ŋ	LEVEL	-	
	ITEM	16. TASK, ELENENTS	7 INTITATING CHES	317		
Ľ	2000				19. STANIARDS	20. NOTES
ر 	7007	Cost N C 1. 13	TC directs after maingun	As Gunner in a CFV crew.	An accurate relationship	001 Recall location 2
		1048 5.6. 3-73	is boresighted	in a CEV. with 7.62mm	between the cunner's sicht	function of switches
_	-			MG (M-73) mounted and	reticle and the 7.62mm	controls and indicas
_	;	Lay boresight maingun on the		sighting equipment present cun hore is established	Fun hore is established	The second second
		alming point		in daylight	at a 600 meter aiming point	012 800311 6400000 10
	•			Vehicle is parked on level		of fire control contr
	7.	Set elevation/traverse power		terrain, maincun has been		a title control eduti
		suitch to OFF and verify that		horesighted		01/, 000000 6:00
_		51		A distinct aiming point		South Smooth
_		in S (sale) position		approximately 600 meters		The state of the s
	·			away is clearly visible		015 Inchall diemount
	'n	Loosen three set screws on				Thomas and the series
_		cutside collar		Necessary tools and MI7Al		•
	7			binoculars are available		111111111111111111111111111111111111111
	;	Remove electrical lead from				053 Page 11 hogagisht.
		receiver and remove receiver		Assistance is available		Proposition for the 7
		from jacket assembly				procedures for the /.
						coax machine gun
	٠,	Loosen mounting screws, jam				
		and horizontal adjustments				
	`					
	ė	Focus on aiming point with				
		right side of MI7Al binoculars				
		through bore and align hore				
		with aiming point				
	7.	Tighten mounting screws, lock-				
		ing and iam nuts, and re-				
		assemble receiver. Reconstruc				
		electrical lead				
- 1	8	Tiphten collar set screws				
ро	Form 115	FB Form 1159c (USAADS) 21 Mar 80		Previous editions of this form are absolute		30 1343 BS A
						01.0401.00

		JOB DATA WORKSHEET (TRADOC Pam 350-30)	ORKSHEET 350-30)				Page <u>5a of i</u>
JOB TITLE	12F		DOS	CEV Change Tacks			
DUTY CODE	O. Perform Prepare to Fire C	hecks	LEVEL SL2				
ITEM CODE	16. TASK, ELETENTS 17.	17. INITIATING CUES	18. CONDITIONS	19.	STANDARDS	20.	NOTES
C2002	_						
9.	Stow tools and equipment					-	
						 - 	
						-	
				-		-	
				-			
						-	

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10B TITLE		(TKADOC Pam 350-30)	350-30)		THE ITE
. 1.	12F		CEV Cunnery Tasks	asks	
DUIY CODE	O. Perform Prepare to Fire Checks	cks	LEVEL SL2		
	16. TASK, ELEMETS J.P.M.	17. INITIATING CUES	18. CONDITIONS	19. STANDARDS	20. NOTES
l	Boresight the 7.62mm coax	TC directs after maingun	As Gunner in a CEV Crew,	An accurate relationship	001 Recall location an
	M.G. M-240	is boresighted	in a CEV, with 7.62mm MG	1_	function of seitches.
٦.	lay boresighted maingup on		ing equipment present	NG bore is established	controls and ladicator
			in daylight	at a 600 meter aiming point 012 Recall stowage loc	012 Recall stowage loc
			vehicle is parked on level	_	of fire control equipm
5	Set elevation/traverse power		terrain, maingum has been		
	suitch to CFF and verify that		boresighted.	•	014 Operate fire contr
	gun is unloaded, bolt is for-		A distinct aimint point		equipment
	ward		approximately 600 meters		
			away is clearly visible		015 Install/dismount a
ع	Remove buffer, driver spring,				stow direct fire sight
	mounting Fin, slide rod and		Necessary tools and MI7Al		equipment
	bolt assembly		binoculars are available		
					053 Recall boresightin
	locaten counting nut and tight-		Assistance is available		procedures for the 7.6
	en to 1/1 turn past touching				coax machine gun
	Washer				
۶.	Fosus on arming boing with				
	sirit side of 11/Al hingen-				
	lars through bore and align				
	tore with aiming point				
ċ					
7.	Represent to machine gun				
œ	Return halt to forward posi-				
	tion				
	Stor teels and couldment				
1 2			The same and wide to seem the same of		.4

		JOB DATA WORKSHEET (TRADOC Pam 350-30)	KSHEET 350-30)		Page 2_of;
JOB TITLE	12F		DOS CEV Gunnery Tasks	Tasks	
LUTY CODE	DE O. Perform Prenare to Fire Check	ۍ. حد	LEVEL		
ITEN	16. TASK, ELECTRIS	7. INITIATING CUES		19. STANDARDS	20. NOTES
55053	Aliga infinity sight with 7. Com con M. G.	7.62mm coax MG (M-73 or M-240) has been beresights	As Gunner in a CEV crew in a CEV with 7.62mm NG	An accurate relationship is established between	001 Recall location a function of switches.
	1. 7.62mm H.G. has been bore-		supported and borgesighted, the infinity sight and suppting equipment instal 7.62mm coax MG hore at	the infinity sight and the 7.62mm coax MC hore at a	controls and indicate
			led	500 meter aiming point	012 Recall stowage to
-	aming prant		vehicle parked on level		of fire control equip
	2. Set master battery switch		with run layed on a 500		015 Install/dismount
			meter aiming point which		stow direct fire sigh
	spitch to ON and adjust infi-		is clearly visible		equipment
	alty reticle brightness				
					USS Recall poresighti
n 	3. Animst intimity reticie in				procedures for the /.
	divation and azimuth to				coax machine gun
	CONTRACTOR MALES CONTRACTOR				
.,	Set infinity control toygle				
	switch and master battery				
	power switch to OFF				
	•				
					C2002 Boresight 7,62m
					MG (M-73)
					C2003 Barrers 7 62-
					MC (M-2/O)
					(0.4.2-0.1)
FB Form	FB Form 1159c (USAADS) 21 Mar 80	-	Previous editions of this form are absolete.	••••	30-1393-B3 AFI

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FUNET LEVEL LEVE	POS CEV Cunner Tasks EEVEL			JOB DATA WOR (TRADOC Pam	XSHEET 350-30)		LATE
TEVEL SIZ 17. INITIATING CUES 18. CONDITIONS 19. STAMPARDS 20.	LEVELS 18. COUDITIONS 19. STANDARDS 20. 3.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2.1.2. 2	JOB TITLE	12F		1	, and a second	
18, CC:DITIONS 19, STANDARDS 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20, 20,	N. ELFENTS 1. INITIATING CUES 18. CCDITIONS 19. STANDARDS 20.	UTY CODE	Perform Prepare to Fire	cks			
Marce Decide As Conner in a CEV crew, Adjust the center of DOI Reca	1.60m motors N.G. Zeroing has been directed As Gunner in a CEV crew, Adjust the center of Guncies 1.60m motor all within the function 1.60m motor all within the 1.60m motor all within the function 1.60m motor all within the 1.60	ITEN	TASK, ELEMENTS J.P.M.	١.	CONDITIO		
In a CEV Darked on level Infinity sichly plated of controls	In a CEV, parked on level burgst to fall within the function	(2002)	Zero the 7.62mm coax M.G.	Zeroing has been directed	As Gunner in a CEV crew.	Adjust the center of	001 Recall location an
1					in a CEV, parked on level	burst to fall within the	function of switches,
7.62mm crax MG is mounted a 600 meter shaing point 100 Recard 1.62mm crax MG is mounted 1.62mm crax MG is	1.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0	-	Lay gun on 600 meter aiming		terrain, in daylight.	infinity sight picture of	controls and indicato:
A clearly of and bereapfited with 100 1010 1010 1010 1011 1011 1011 1011 1012 1012 1012 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 1013 10	December		point using N32C periscope		7.62mm coax MG is mounted	a 600 meter aiming point	
					and boresighted with 100		
A clearly delined target Ings A clearly delined target Ings In	Approximately don meters Approximately don meters Large the gun and	2.	Adjust light intensity of		stdelieve sbunor		safety cautions and w.
Approximately 600 meters 2012 Recall to 25 round burst 2021 Recall to 25 round burst 2014 Decr. 201	Partice the pun and away has bee designated 012 Recall away has bee designated 014 Oper two 25 round burst 014 Oper two strike area 015 Instruction and two strike a		infinity sight reticle		A clearly defined target		ings
10 2 Recall	1				approximately 600 meters	•	
10 25 round burst	10 25 round burst 10 20 20 per 10 20 20 per 10 20 20 20 20 20 20 20 20 20 20 20 20 20		Load and charge the gun and		paseudisap aag sei kene		012 Recall stowage loc
14 Operators 15 O	1014 Operators 1014 Operators 1015 Statist borters strike area equipment 1016 strike area 015 Instrict 1017 Instrict 015 Instrict 1018 strike area 015 Instrict 1019 strike area		fire a 20 to 25 round burst				of fire control equip:
1014 Oper 1014 Oper 1014 Oper 1015 in the straight 1015 in	1014 Oper						
to siming point and	1	4.	Sithout disturbing Sun lay,				014 Operate fire cont:
to aiming point and or 20-25 round Organisation of the contert content conte	to simile strike area 015 linst to simile point and cut stow diff to simile point and 049 keca cess until center cut cut s. inside sight conter cut s. inside sight cut		use intinity sight boresight				equipment
to aiming point and er 20-25 round er 20-25 round er 20-35 round er 20-35 round er 20-45 round er 20-55 round equipmen e	to aiming point and cr 20-25 round c		RECORD to center strike area				
to aiming point and our 20-25 round our 20-25 round out 20-25 round cess until center is inside sight out 20-25 round	to alming point and equipment equipment custs until center s. Inside sight custer case until center customer case until center customer case until center customer case until center customer cu		in the reticle				015 Install/dismount:
to aiming point and er 20-25 round of 9 keca of 9 kec	to aiming point and equipment of a ming point and certification and certification and certification and certification at the form are absolute. 1 a mingle sight center center cedures cedures cedures cedures center cedures cedures center center cedures cedures center center center center center center center center cedures center						stow direct fire sight
cess until center is inside sight is i	cess until center 049 Reca cess until center cedures s inside sight 053 Reca cess until center 053 Reca cess until center 063 Reca procedur coax mac coax mac coax mac	د	Relat gun to aiming point and	9			ednibaeut.
cess until center s inside sight cedures cedures gun gun procedur coax mac	049 Reca		fire another 20-25 round				
s inside sight s inside sight coda sight coda mac	Cedures Cedures Cedures Cedures Cedures Cedures		burst				049 Recall loading pro
s inside sight s inside sight Cook mac Cook	s inside sight s inside sight Coax mac						cedures for 7.62mm mac
s. inside sight Description Proceeding C2003 Bo	21 Mar 80	.	Repeat process until center				ună
053 Reca 053 Reca 053 Reca 054 Reca 055 Reca	21 Mar 80		of burst is inside sight				
Proceedings Procedings Procedings Procedings Procedings Proceedings Procedings Pr	21 Mar 80		reticle				053 Recall boresightir
C2002 Bo C2002 Bo MG (N-73 MG (N-24	21 Mar 80						procedures for the 7.6
C2002 Bo NG (N-73 NG (N-24	21 Mar 80						coax machine gun
C2002 Bo NG (N-73 NG (N-74	21 Mar 80						
MC (N-73 C2003 Bp. C2003 Bp. C2003 Bp. C2003 Bp. C2203	21 Mar 80						C2002 Boresight the 7.
CC2003 Bo. NG (N-24)	21 Mar 80						Mc (M-73)
MG (N-24,	21 Mar 80						
MG (M-24)	21 Mar 80						C2003 Boresight the 7
Previous aditions of this form are absolute.	21 Mar 80						NG (N-240)
Previous editions of the form are absolute.	21 Mar 80						
	ZI Rat 80		;		Previous editions of this form ere abso	Nere.	30-1303 B3 AFP

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30-1393-B3 AF Page Ba of -C2004 Align the sight NOTES 20. STANDARDS CEV Gunnery Tasks 19. Previous editions of this form are obtaints. SL 2 CONDITIONS LEVEL DOS JOB DATA WORKSHEET (TRADOC Pam 350-30) 18. INITIATING CUES 0. Purform Prepare to Fire Checks
16. TASK, ELEMENTS 17. FB Form 1159c (USAADS) 21 Mar 80 ITEM CODE C2005 JOB TITLE DUTY CODE B-18

			JOB DATA WORKSHEET (TRADOC Pam 350-30)	350-30)		Page 9 of
JOB TITLE	i	12F		DOS CEV Gunnery Tasks	Tasks	
DUTY CODE	ł	0. Perform Prepare to Fire Cha	iecks	LEVEL SL2		
ITEM		16. TASK, ELEMENTS	17. INITIATING CUES	18. CO::DITIO::S	19. STANDARDS	20. NOTES
C2000		"Perecioht the 165mm M-135	Prepare to fire drill is	As Gunner in CEV crew, in	1 1	OOl Recall location
		naingun	under way	a CFV preparing for combat		function of switches
				or for a firing exercise	┪	controls and indicate
	;	ewitch and maintain switch		terrain, Sighting equip-	600 neter aiming point	011 Recall maingun be
		to OFF, and master battery		ment is installed		sighting procedures
		waitch to 03. Unlock turret				
		traverse lock. Depress gun		A distinct aiming point,	•	012 Recall stowage 1
		manually to remove excess play		approximately 600 meters		tion of fire control
				away is visible		equipment
_	۷;	Direct loader to secure bore-				
		sight cord over muzzle		Breech boresight, horesigh	th	014 Operate fire con
3-		witners lines with tape		cord, tape and MI7Al binge	oc+	equipment
19				ulars are available		
	۳.	Luck breech open and install				015 Install/dismount
	;	breech boresight		Assistance is available		stow direct fire sign
						equipment
	4.	Align bore with right angle		Adjust M32C only in dark-		
		corner of target using		ness to prevent light		
		manual elevation and traverse		damage		
	٥.	Select HEP reticle in 105F				
		telescope and adjust tele-				
		scope reticle to aiming point				
		and verify bore on aiming				
		point				
		Install and adjust visible				
		light body reticle for M32C.				
		idjust only in darkness				
FB Form	1159	FB Form 1159c (USAADS) 21 Mar 80		Previous editions of this form are obsulete.	beclete.	30-1393-83

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		JOB DATA WORKSHEET (TRADOC Pam 350-30)	.к sнее т 350-30)		Page 10 of
JOB TITLE	12F		DOS CEV Gunnery Tasks	sks	
DUTY CODE	0. Perform Prepare to Fire Ch	hecks	LEVEL SL2		
ITEM COLE	16. TASK, ELEMENTS J.P.M.	17. INITIATING CUES	18. CONDITIONS	19. STANDARDS	20. NOTES
10065	Perform Tank Commander (TC) Pretare Checks	Combat or training firing mission is ordered	As the TC in a CEV crew in a stationary CEV	All checks completed in coordination with other	001 Recall location at function of switches,
j	Command "PREPARE TO FIRE"		During daylight or night	crew members, within 5	controls and indicator
			bat or training firing		003 Recall proper cle
2.	Switch radios to OFF during			arnings	ing procedures for op:
	engine start		TN 9-2350-222-10-1 is		cal equipment
ئىم	Clear furrat exterior lone		present	Supervise completion of	of O(8 Born11 that warding
;	and vision devices			orner crew members checks	must be switched to 0
					during engine start
4.	Check M34 or M36 periscope				
	in the second				009 Recall firing cir
Ġ	COTTAIN CHECK FIRING				test procedures
					013 Recall gun contro
6.	lest firing control circuit				check procedures
	<u> </u>				
	and gunner				048 Recall boresighti:
7.	Command "CHECK GUN CONTROLS"				machine gun
œ	Thank one controls for nouer				Ta pained Head OSD
i	elevation and traverse				cedures for Cal. 50
•					machine gun
, ,	Correspond TOHECK FIRE CONTROL"				73000 T
10.	Check operation of Cal. 50				Cal. 50 M85 MG
11.	Circk firing operation of				
Form 115	FB Form 1159c (USAADS) 21 Mar 80		Previous editions of this form are absolute.	plote.	30-1393-83 AF

GEV CARTHEAY Easts CC: u 1 LEVEL DOS JOB DATA WORKSHEET (TRADOC Pam 350-30) 18. 17. INITIATING CUES 0. Perform Prepare to Fire Checks Command "KEPURT" to crew and receive reports Load Cal. 50 MG if required Supervise crew performance and coordination of checks TASK, ELENENTS J.P.M. Boresicht Cal.50 MG . 9. C3001 12. 13. 15. TULY COLE 14. JOB TITLE ITE::

72 Total 1159c (USANDS) 21 Mar 80

		JOB DATA WORKSHEET (TRADOC Pam 350-30)	KSHEET 350-30)		Page 11 of Pa
JOB TITLE	12F		500		
התוא כספ	erform Prepare to Fire	Chocke	LEVEL CEV Gunnery Jasks	Jusks	
ITEM		INITIATING CUES	18. CONDITIONS	19. STANDARDS	20. NOTES
CSCSIA	Periorm Tank Commander (TC)	Combat or training firing	As the TC in a CFV crew in	All chocks completed in	001 00-111
	Pretare Checks for maingun	mission is ordered	a stationary CEV		function of suitcher
-			Pering daylight or night	crew members, within 5	controls and indicator
;	Command Treetake 10 FIRE		Prior to initiating combat	minutes (boresighting take	لنسا
2.	Clear turnet exterior lens		or training firing	additional time)	
	santage untite gur		TM 9-2350-222-10-1 is pre-	discrye salety warnings	ing procedures for opt
	ē		sent	Supervise completion of	Sal Citatoment
; 	Check 1134 or 1136 periscope		,	other crew members' checks 009 Recall firing circi	009 Recall firing circi
`					test procedures
	Command Child FIRITO				
2	200 1 1 11 12				013 Recall gun control
					check procedures
; 	in a production with 15 dog				
9	Cornand "CHECK OUR CONTROLS"				
İ					
;	Check Gun controls for power				
	elevation and traverse				
 	Supervise orcw performance				
	and coordination of checks				
· 6	Command "FERGET" to crew				
-					
- 10.	Receive reports				
FB Form 115	FB Form 1159c (USAADS) 21 Mar 80		Previous editions of this form are obsolete.		30-1393-B3 AFPP-

		JOB DATA WORKSHEET (TRADOC Pam 350-30)	WSHEET 350-30)		Pagel 2 of
JOB TITLE	12F		DOS		
DUTY CODE	D. D. State of the Control of the Co		LEVEL	S	
744-	TYCK ETFORM TO PITE CHECKS	(S	SL3		
CODE	6. LASK, ELECTION 17	17. INITIATING CUES	18. CONDITIONS	19. STANDARDS	20. NOTES
C3002	boresight the cal . 50 M-85 MG (Cal . 50 MG is being instal	. 50 MG is being instal-As TC in a CFV crew in a	An accurate relationship	200 0000 110000
		led, combat or training	CEV with 385 MG mounted	is acroblished between	001 Recall 10cation :
.; 	Remove periocope hody	firing mission is ordered,	and sightine equipment	the M85 hore and the M34	controls and indicat
·	7	or prepare to fire drill	present, in daylight	and M36 sight reticles	tourious and marcare
۶.	,†	is being performed	vehicle is parked on level	at a 500 meter aiming	012 Recall stowage 1
	or land and an ore client gun as		terrain	point	tion of fire control
					cquipment
	Fortower hard alata hadean		A distinct aiming point,		
;	Trong to be presented bulled		approximately 500 meters		014 Operate fire con:
	or of the design in the control of the control		away, has been identified		equipment
4	Allon the center of the harrel				015 Install/dismount
	with apping point by manually				stow direct fire sigi
	resuttaning the capola and				equipment
	etimare the azimuth lock				3
					818
'n	Install the M34 periscope and				procedure for Cal .50
	adlust elevation and traverse				machine gun
	until 300 meter afming point				051 Recall accombly/
	is aligned with aiming point.				disassembly procedur.
	soldre slip scale on elevation				the Cal . 50 MS5 machi
	The state of the s				gun
	71110				
و	Remove 334 and install M36				
7.	Adjust elevation and traverse				
	until 500 meter afming point				
	in allened with aiming point.				
	Kotate slip scales on eleva-				
	tion knobs to read 4 and 4				

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Pagel 2a of P. DATE			20. NOTES																30-1393-B3 AFPF
	, v		STANDARDS																
HEET 0-30)	DOS CEV Gunnery Tasks	LEVEL	CONDITIO																Previous editions of this form are obsolete.
JOB DATA WORKSHEET (TRADOC Pam 350-30)		ķs	17. INITIATING CUES 18.								,								
	12F	0. Perform Prepare to Fire Checks	16. TASK, ELEMENTS	Prinave X36 body	Brasserble belt assembly,	and back plate	Caronina bear sold [1,480]	Apod											FB Form 1159c (USAADS) 21 Mar 80
	JOB TITLE	DUTY CODE	ITEN	<u> </u>	.6		<u> </u>		 					 					FB Form 1159c

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Page 13 of 1			20. NOTES	001 Recall location a	function of switches.	controls, and indicat		010 Recall ammunition	safety cautions and w	ings		012 Recall stowage 10	of fire control equip.		014 Operate fire cont	equipment	015 Install/dismount	stow direct fire sigh	equipment		048 Recall boresights	procedure for cal .50	machine gun		loadi	cedures for cal .50	machine gun		C 1002 Boresight the c	.50 1185 MG		C3102 load the cal 5	M85 MG	30-1393-B3 AFF
	Tasks		19. STANDARDS	Adjust burst to 500 meter	aiming point for both	periscopes			•																									
SHET 150-30)	DOS CEV Gunnery Tasks	LEVEL SL3	18. CONDITIONS	-	5 mounted and	horesighted	100 rounds ammunition	available, parked on level	terrain, in daylight	500 meter target has been	designated																							Previous editions of this form are obsolete.
JOB DATA WORKSHEET (TRADOC Pam 350-30)		ıks	17. INITIATING CUES	Zeroing has been directed								7																						
	12F	O. Perform Prepare to Fire Check	16. TASK, ELEMENTS	Zero the cal .50 M-85 MG		the Mid or 136 periscope	sight to law run on 500 meter	aiming point by traversing	and elevating capola		Load and enarge the MG and	fire a 10 to 20 round burst		Check lay of the gun after	tiring and readlust to aiming	point if necessary	Without moving run lay, adjust	· ~	vation until 500 meter aim-	ing point is at center of	rurst strike area		Fire another 10 to 20 round	turst to confirm zero		kepeat procedure for other	periscope	Verity nonballistic reticle	aiming point of 236 IK peri-	scope by firing a burst at	same target at dusk or with	search licht illumination		 FB Form 1159c (USAADS) 21 Mar 80
	JOB TITLE 1	DUIY CODE	11EN 100	52003		 					2.			 	B-	15	 .7				•		5.			•		 ·						FB Form 1159c

		JOB DATA WORKSHEET (TRADOC Pam 350-30)	XSHEET 350-30)		Page 14 of 1.
JOB TITLE	12F		DOS CEV Cunnery Tasks	Tasks	
DUIY CODE	1. Perform Ammunition Handling	8	LEVEL SL1		
ITEM	16. TASK, ELEMENTS J.P.W.	17. INITIATING CUES	18. CONDITIONS	19. STANDARDS	20. NOTES
C1101	Perform lander misfire pro-	Round fails to fire after	In a CFV dur	Periormance measures	006 Operate breechble
	redured for maxingum	handle triesers mannal	mission with mernann	accomplished in sequence,	operating handle
;	Dait 2 minutes after last	elevation firing button.	As leader	memory, in a safe manner	010 Recall ammunitio:
	attempt to fire	and the manual firing	Supervision is available		safety cautions and v
,		bandle have been operated		Action completed, or	ıngs
.,	round			4 minutes of last attempt	Olf Recall misfire n.
				to fire for at least 2	cedures
<u>ب</u>	If wearon is too hot to un-			hours	
	load, wast additional 2 min-			Unfired round is placed a	
	ntes and unload round, close			sate distance from all	
	breech			personnel	
. 4	If still ten bot to unload,				
	antorm 10				
J.	became to VVO as about				
;	breech				
. 6	If round does not "cook off",				
	resenter CEV after gun has				
	cooled and unload round				
ı					
:	Remove round from vehicle				
	trem all tersonnel				
FB Form 115	FB Form 1159c (USAADS) 21 Mar 80		Previous editions of this form are obsolete.	olete.	30-1343-B3 AFP

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			JOB DATA WORKSHEET (TRADOC Pam 350-30)	KSHEET 350-30)		Page 15 of Pag.
1	JOB TITLE 12F			DOS CEV Gunnery Tasks	Tasks	
	DUTY CODE	Perform Ammunition Handling		LEVEL SL1		
	ITEM CODE	16. TASK, ELEMENTS 16. J.P.M.	17. INITIATING CUES	18. CÓNDITIONS	19. STANDARDS	20. NOTES
	C1102	Load/stow 165mm maingun	Ammunition supply/resupply	As a CEV crew member	Rounds stowed in ready	007 Recall ammunition
		arrenition.	is delivered	siven a CEV and 165mm ammunition.	age rack and secured so	serviceability criteria
	1.	Install inner rounds in ready	TC directs loading	All weather, day or night,	as not to fall or bounce	010 Recall ammunition
		rack		in or out of combat		safety cautions and war
	(Rounds are removed from	ings
	2.	Secure unner rounds			stowage with out losing	- 1
					control of rounds or allow-	- 1
	·	Install outer rounds in ready			ing them to fall over	lock must be in the loc
		rack				ed position before re-
R-					All safety cautions and	moving/stowing ammunit:
27		Serure outer rounds			warnings observed .	in hull stowage
	•					
	5.	Remove outer rounds from				019 Recall procedure fo
		ready rack				installing/removing in:
						and outer rounds in 16:
	. 9	Remove Inner rounds from				ready rack
		ready rack				
_						020 Recall procedures :
	7.	install and secure rounds				installing/removing rou
		in the tubular stowage rack				from 165mm tubular stow
	c					age rack
		Remove rounds from the				
		tubular stowage rack				
_						
_						
_						
لـ						
됴	FB Form 1159c (USAADS)	c (USAADS) 21 Mar 80		Previous editions of this form are obsolere.		30-1393-B3 AFPP-F

		JOB DATA WORKSHEET (TRADOC Pam 350-30)	SHEET 50-30)		Page 16 of P. UATE
JOB TITLE	12F		DOS CEV Gunnerv Tasks	1cks	
DUTY CODE	1. Perform Ammunition Handling		LEVEL		
ITEN CODE	16. TASK, ELEMENTS	17. INITIATING CUES	18 CONDITIONS	19. STANDARDS	20. NOTES
C1103	Load the M-135 maingun	Place order of the IC or	as the loader in a CEV	Round is loaded and pro-	One Operate breechbler
		Ennner	crew, given a CEV with	nerly seared, withour	operating handle
7.	Set maingun safety switch to		urmunition stowed	violation of safety restri	-4
	SAFE		Daylight or Dark, under	ctions, within 5 seconds	010 Recall ammunition
r			all weather conditions,		safety cautions and w
;	offen breechiock iully, and		in comme or our ing train-		5001
	and free of debris after each				1011 Recall mistire pr
	round				cedures
3.	seturn operating handle to				
	lacted position				017 Recall that turrer
					lock must be in locke.
. 7	Remove round from ready rack,				position before remov:
	place projectile on breech-				stowing ammunition fro
	block rollers, insert and				hull storage
	sent tound				
					1018 Recall that cun st
'n					not be elevated above
	irch the round				Mils (10 degrees) duri
`					loading
ċ	Close the breechblock				
7.	Return maingun saiety switch				installing/removing in
	to FIRE, and remain clear of				and outer rounds in 16
	il narh				Transfer mach
80	Announce "ttp"				
;					Cliol Perform misfire
					egdures for maingun
					C1102 Load/stow 165mm .
					gun ammunition
B Form 1159	8 Form 1159c (USAADS) 21 Mar 80		Previous editions of this farm are obsolets.	olete.	30-1393-B3 AFP

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1. Perform A 1. Perform A 1. Perform A 1. Jad/srov byg Staw maincum Staw Cal. 50 an turret floor Staw Cal. 45 an tur	JOB DATA WORKSHEET (TRADOC Pam 350-30)	DOS CEV Gunnavy Tacks	LEVEL	770		Preparation for combat As a crew member in a CEV All ammunition is correctly	Ammunition is issued for comba	Safety cautions and warning	are observed without error		Jock must by in locks			DULT SECKDE	Old Recall proceeding				020 heiter 6 hi	ירי לוז על לבין זון מבול אינוי אינו	C0012 Load/stow 165m-	maingun ammunition				
	JOB (TRADI	12F	1. Perform Ammunition Handling	TASK, ELEMENTS 1.	J.P.%.	Preparation is undergan	Stok maincup amounition amounition is issued	Stow 7.62mm assumption in		State Cal St ammanathian in		Stow Cal. 45 ammunition in	islividaal turret storage			September of the party of the september	In our that all amounts on	is preserly secured								

Page 18of P.			20. NOTES	001 Recall lecation a	se function of suitches.	o centrols and indicate:	OO7 Rocall ammunition	╀	-	e 010 Recall ammunition	safety cautions and	s warnings		. 049 Recall loading pr	cedures tor 7.62mm	machine gun														
	Tasks		19. STANDARDS	Ammunition is correctly	loaded so as not to cause	malfunction or domage to	uni	Link loops face down when	ammunition is fed through	the ammunition box chute		All caution and warnings	are observed																	
SHEET 150-30)	DOS CEV Gunnery Tasks	LEVEL SL1	18. CONDITIONS	As loader in a CEV crew,	in a CFV, 7.62mm coax	26 (N-220) is mainted	description 18 available																							
JOB DATA WORKSHEET (TRADOC Pam 350-30)		t.	. INITIATING CUES	Fire mission is eminent	or Prepare to fire drill	is underway																								
	12F	1. Perform Ammunition Handling	16. TASK, ELEMENTS	e 7.62mm ceax MG	(3, -1, 6)	T	TOTAL CLAVOLSE FOR IS SEE	1	Of F and satety to F (tire)		Pull charger handle to rear	and net salety to S (safe)		Earse cover and feed tray	and otherk that chamber is	clear, Lower teed tray	Feed urrunition belt through	chate, place tirst round in	ived tray with open side of	link down and push against	cartradge stop		Clove and latch cover, and	check that latches are lock-	r.d					
	JOB TITLE	DUTY CODE	1 3000 1 3000	 '			:	1			2.			<u>ب</u>	ائے	ات	.,					LL	٠ <u>.</u>	1	لب. 	<u>.</u>			 	 _

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		The state of the s		التسايد والمسادرة	فسيكاست العالمة والمستحددة
		JOB DATA WORKSHEET (TRADOC Pam 350-30)	, KSNEET 350-30)		Page 19 of Pa
JOB TITLE	12F		DOS CEV Gunnery Tasks	Tasks	
DUTY CODE	1. Perform Ammunition Handling	8u	LEVEL SL1		
TTEM CODE	16. TASK, ELEIENTS J.P.W.	17. INITIATING CUES	18. cónditions	19. STANDARDS	20. NOTES
C1106	Load the 7.62mm coax MG (M-73	Fire mission is eminent or Prepare to fire drill	As loader in a CEV crew,	Ammunition is correctly loaded so as not to cause	001 Recall location and function of switches.
; -	Turret traverse lock is set	is underway	(M-73) is mounted	malfunction or damage to	controls and indicator
	switch to OFF, and machine		audulition is avaitable	•	007 Recall ammunition
	gun switch to OFF			Link loops face down when	1 - 1
,			,	ammunition is fed through	
7.	Set satery to F (fire) and			the ammunition box chute	010 Recall ammunition
	puil charging handle to rear			Possession of the second	sarety cautions and wa:
3.	Raise receiver cover and feed			prior to opening receiver	- HE -
	tray			cover	049 Recall loading pro-
					cedures for 7.62mm maci
.,	Check that barrel extension			All cautions and warnings	gun
	is back and chamber is clear,			are observed	
	then lower feed trav				
· ·	Freed arminaition helt through				
	chute, place first round in				
_	feed tray with open side of				
	link down with first round				
<u> </u>	over slot in feed tray				
4	Charles course and charles that				
; 	cover latch rol is forward				

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Page 20 of Page MTE			20. NOTES	001 Recall location and	function of switches,	controls, and indicator		010 Recall ammunition	safety cautions and war	ings		Olo Recall mistire pro-	cedures						CllU5 Load the 7.62mm	coax MG (M-240)		CI106 Load the 7.62mm	coax MG (M-73)													Dis Time and April.
	Tasks		19. STANDARDS	Within 10 seconds, apply		re-engage target		All safety warnings and	cautions are observed																											
SHEET 50-30)	DOS CEV Gunnery Tasks	LEVEL SI.1		As loader in a CEV crew	in a Cev, while firing	the 7.62mm coax MG, a	stoppage occurs																													Braugh and the fifther of the strength of the strength
JOB DATA WORKSHEET (TRADOC Pam 350-30)			17. INITIATING CUES	Round fails to fire while	firing the 7.62mm coax	NG.																												36	ir, and	
		Perform Ammunition Handling		Apply immediate action to	reduce a stoppage in the	7. + 2000 336		For a cold gun! Wait 5	seconds	1	Full back charging handle	and press trigger		It gun stops again, wait 5	load,	satety to "f", pull charger	handle to rear, and let	charger handle go forward	slowly while pressing trigger		load yen and try to fire	manually. If gun stops	again, wait 5 seconds, un-	load and troubleshoot gun		Pull back charger handle,	and press trigger.		If pun stops again, wait 5	seconds and unload with 5	soconds		If run cannot be unloaded	within 5 seconds, pull charging	nandle to the rear, close cove	Form 1150. (private) no a wo
	JOB TITLE	TUTY CODE	ITEM CODE	C1107					_1	l-	; B			~ ~	1		!		!					_1	 ~. ~.	1		_1	•	_,	1	_1		_1		Form 1150.

Page 20a of Pag NOTES 20. STANDARDS CEV Gunnery Tasks 19. SL1 CONDITIONS LEVEL SOG JOB DATA WORKSHEET (TRADOC Pam 350-30) 18. 17. INITIATING CUES DUTY CODE 1. Perform Ammunition Handling Peep gun pointed at target for_15 minutes, to cool TASK, ELEMENTS J.P.M.) e JOB TITLE 12F

ITEM CODE C1107

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		JOB DATA WORKSHEET (TRADOC Pam 350-30)	KSHEET 350-30)		Page 21 of
JOB TITLE	12F		DOS CEV Gunnery Tasks	Tasks	
DUTY CODE	1. Perform Ammunition Handlin	Bu	LEVEL SL2		
ITEM	16. TASK, ELEMENTS J.P.M.	17. INITIATING CUES	18. COMDITIONS	19. STANDARDS	20. NOTES
C2101	Perform gunner mistire pro-	Round fails to fire during	As Gunner in a CEV	Performance measures accom-	001 Recall location
	cedures for maingun	a fire mission	During a fire mission with	plished in sequence w	function of switches
	Approximate "MISETRE"		maingun toaded	a safe manner	controls and indicat
	_		Supervision is available		010 Recall ammunitic
2.	Ecop muzzle trained on target			Actions accomplished on a	safety cautions and
				vehicle evacuated within	warnings
٠ <u>.</u>				4 minutes of last attempt	
	murale and recoil path			to fire for at least two	016 Recall misfire p
		,		hours	cedures
4.					
	in sequence gunner and TC hand	21		Unfired round is removed	
- 3	control trigger, manual eleva-			from vehicle and placed a	
	tion firing button and the			safe distance from all	
	manual firing handle			personnel	
.5.	Wait 2 minutes after last				
	attempt to fire, and then				
	direct loader to unload				
	round				
.9	If the weapon is too hot to				
	unload, close breech, wait 2				
	more minutes, then direct				
	leader to try to unload again				
	_				
7.	_	•			
	interm IC and evacuate CEV on				
	order for two hours, or until				
	tim is cooled				
80					
	land after weapon has cooled,				
FB Form 115	FB Form 1159c (USAADS) 21 Mar 80		Previous editions of this form are absolute.	llete.	30-1393-B3 AF

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17 12 12 12 12 12 12 12		DATE
Perform Annunition Handling TASK, ELENENTS J. P. M. 17. INITIATING CUES 18. CO:DITIONS Old Tound (as directed by cet loader to place uncet round a safe distance of round (as directed by TC) round (as directed by TC)	Tasks	
rosk, ELENENTS 17. INITIATING CUES 18. c. loader re-enter CEV and had revered by sect loader to place uncertaint a safe distance whence and all personnel directed by TC) ure that round location hortified for disposal of round (us directed by TC) round (us directed by TC)		
ave loader re-enter CEV and nload round (as directed by C). irect loader to place un- ired round a safe distance ired round a safe distance as directed and all personnel as directed and all personnel sproperly marked, and EDD s properly marked, and EDD s properly marked, and EDD s properly marked and EDD he round (as directed by TC)	19. STANDARDS	20. NOTES
irect loader to place un- irect loader to place un- ired round a safe distance ired round and all personnel as directed by IC) s property marked and Eloh s notified for disposal of he round (us directed by IC)		
irect loader to place un- ired round a safe distance ired vehicle and all personnel as directed by TC) surve that round location s properly marked, and E0D s notified for disposal of he round las directed by TC)		
irect loader to place un- ired round a safe distance row vehicle, and all personnel as directed by IC) Baure that round location s properly marked, and EUD s notified for disposal of he round (as directed by IC)	, .	
ired round a safe distance from vehicle and all personnel as directed by TC) s properly marked, and EOD s notified for disposal of he round (as directed by TC)		
as directed by TC) msure that round location s properly marked, and EOD s notified for disposal of he round (as directed by TC)		
as directed by TC) nsure that round location s properly marked, and EOD s notified for disposal of he round (us directed by TC)		
hsure that round location s mortified for disposal of he round (us directed by IC) he round (us directed by IC)		
s property marked, and EOD s property marked, and EOD s notified for disposal of he round (as directed by TC)		
s properly marked, and EOD s notified for disposal of he round (us directed by TC)		
he round (as directed by TC)		
he round (us directed by TC)		
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			JOB DATA WORKSHEET (TRADOC Pam 350-30)	KSHEET 350-30)		Page 22 of Page 147E
٦,	JOB TITLE	12F		DOS CEV Cunnery Tasks	Tasks	
15	CUIN CODE	1. Perform Ammunition Handling	81	LEVEL S13		
<u></u>		TASK, ELEMENTS	17. INITIATING CUES	18. CONDITIONS	19. STANDARDS	20. N. TES
<u>L</u> _	CSTOL	Load the cal . 50 M-85 MG	Fire missions eminent or	As TC in a CEV crew, in a	Ammunition is correctly	001 Recall location an
	1.	Raise cradle acess door and	underway	M-85 is mounted, granuni-	malfunction or damage to	controls and indicator
				and an average of	•	1 1
	2.	With bolt in rear position,			Safety warning and cautions are observed	serviceability criteri
		check that chamber is empty				010 Recall ammunition
3- 3		Close bolt slowly				safety cautions and wa
	.,	Place agminition in feed box				050 Recall loading pre-
_		and feed 3 or 4 rounds into				cedures for cal .50
_		flexible chute				machine gun
	۲,	Feed rounds through flexible				
		chute and place lead round				
		on tray with open side of				
		links down				
		Close cover assembly				
<u>:</u>						
	7.	Operate charger handle to				
		recharge the gun				
	œ	Place safety in "S" (safe)				
<u> </u>	Form 1159	FB Form 1159c (USAABS) 21 War 90		Previous editions of this form are obsolete.	.01914	30-1393-83 AFPP-

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1001 Recall location and function of switches. controls and indicators Ol6 Recall misfire pro-010 Recall ammunition safety cautions and warnings cedures 20. As TC in a CFV crow in a Within 10 seconds, apply CEV, while firing cal .50 immediate action and re-M-85 MG, a stoppage occurs engage target precautions are observed All safety warnings and STANDARDS 19. CEV Gunnery Tasks 51.3 CONDITIONS 200 JOB DATA WORKSHEET (TRADOC Pam 350-30) 8. Round fails to fire while INITIATING CUES firing M-85 MG 17. 1. Perform Ammunition Handling TASK, ELEMENTS 16. J.P.M. Determine cause of stoppage, correct, relead, and conti-Retract bolt and press trig-Eggs weapon trained on tar-Wait 5 seconds for possible Correct a stoppage of the cal .50 M-85 MG using immediate action another 5 seconds and net: if wearon is cold: If weapon fails to fire, Open cover assembly and

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12F

DUTY CODE JOB TITLE

1ТЕМ СОБЕ С3102

If gun does not fire, open cover assumbly and unload FB Form 1159c (USAADS) 21 Mar 80

If weapon is hot, wait 5 seconds for possible hang-

nue engagement

remove ammunition

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retract bolt

Detract the bolt and press

trigger

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Previous editions of this form are obsolete

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NO.	Page 2320 f Pa IATE			NOTES																										
				20.					-										_						1					
Transfer and American		. Tasks		19. STANDARDS				•																						
	HEET 0-30)	DOS CEV Gunnery Tasks	LEVEL SL3	CONDITIONS																										
	JOB DATA WORKSHEET (TRADOC Pam 350-30)			17. INITLATING CUES 18.																										
		12F	1. Perform Ammunition Handling	16. TASK, ELEMENTS 1.	armunition within 5 seconds		If the cannot be unloaded	co forward close cover and	wair 15 minutes before re-	leading		If second stoppage occurs	after clearing, repeat	clearing procedures		If a third stoppage occurs,	wait 5 seconds, unload gun	and troubleshoot gun												
		JOB TITLE 1	Ly.	ITEM CODE	C3102	_1	.0. -T	1_	1	1	لحا	11.			_1	12. L			لــ	 	_1	1	 	_1_	<u>-</u> l.,	1_	1_	1	1	

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FB Form 1159c (USAADS) 21 Mar 80

				The state of the s	March Carlotte Carlot
		JOB DATA WORKSHEET (TRADOC Pam 350-30)	(SHEET 350-30)		Page 24 of Pag
JOB TITLE	12F		DOS CEV Cunnery Tasks	Tasks	
DUIY CODE	2. Occupy Firing Positions		LEVEL SL1		
ITEM	16. TASK, ELENENTS J.P.M.	17. INITIATING CUES	18. CONDITIONS	19. STANDARDS	20. NOTES
C1201	Have into Firing Positions	TC designates firing posi-	As driver in a CEV crew.	Operates vehicle safely	001 Recall location and
_	Drive a CPV in Daylicht	Clon	Siven a CEV	rollows most direct route	functions of switches.
;			all weather conditions	Maintains steady speed	
2.	Drive a CEV at night		in combat, or firing ex-	Avoids obstacles.	002 Perform engine star
			ercises	Minimizes direction changes	and stop procedures
ć			*	Stops vehicle smoothly at	
ň	Follow the heet route to			designated position.	OZO Drive CEV in da-
	designated firing position			Selected position is hull	light or dark
,	20 1 20 1 1 1 down months 1			down, where possible	
÷	Serece a mail down position			level ground available	
'n	Stop vehicle on most level				
	ground available				

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Previous editions of this form are obsolved

FB Form 1159c (USAADS) 21 :13r 80

		JOB DATA WORKSHEET (TRADOC Pam 350-30)	XSHEET 350-30)		Page 25 of
JOB TITLE	12F		DOS CEV Gunnery Tasks	. Tasks	
OUTY CODE	2. Occupy Firing Positions		LEVEL SL2		
ITEM CODE	16. TASK, ELEMENTS J.P.M.	17. INITIATING CUES	18. CONDITIONS	19. STANDARDS	20. NOTES
C2201	Prepare circular range card	Firing position is select-	1 1	Target identification,	012 Recall stowage 1
i	Select reference point in	ed/occupied	card (Card, Tank Range	range, azimutn and quad- rant elevation is accurate-	tion of fire control
	coordination with TC		8724207), pencil and	_	1_
r	1		straight edge, binoculars,		014 Operate fire con
;	Additional Indicator is geroed		during dayinght, in combat		equipment
	on reresence point		firing axercises	is common for both TC and	
	Reference noint is plotted		0,000,000,000,000	ranner to the source of	vio install/dismount
•			Sector of responsibility		ing equipment
Į			is provided		
3-4	Identify targets on range				021 Use military sum
0	card				
					022 Recall the four
	Record deflection				ments required to pl
					target on range card
	Record Funge				02 3 Identify and
7.	Record quadrant elevation				targets
	tor gun				
c					024 Determine target
ò	ror warch light				azimuth
	יייי דיייייייייייייייייייייייייייייייי				
ō	Plot City's sector of rese				025 Use binoculars a
	ponsibility				mil tormula to estim
10.	Mark range card for appro-				026 Recall that best
	printe firme position				source of range is a
	(primary, alternate, or				mounted range finder
	surplemental)				
					027 Determine quadra

* Form 1159c (USAA.DS) 21 Nor 90

Previous editions of this form are on

Page25aof Page: 028 Recall that range cards must be prepared tor primary, alternate C2364 Determine target and supplemental posi-Firing Table FT-165-Al tions 3 STANDARDS CEV Gunnery Tasks 19. SL2 CÓNDITIONS LEVEL JOB DATA WORKSHEET (TRADOC Pam 350-30) اغتاءنو 18. 17. INITIATING CUES Occupy Firing Positions TASK, ELECTRIS ITY COUE B-41 B TITLE TTEN CODE

この 書 ファインのの 記書書 いるけいのは 建書 いいいっかった

for primary, alternate and supplemental position Page 26 of Page 021 Use military symbols 022 kecall the four elecontro to estimate occurately plotted, for cafective engagement during 022 kecall the four elulimited visibility selected ments required to plot reference point is common target on range card to gunner's R.P. 025 Use binoculars and mil formula to estimat 027 Determine quadrant cards must be prepared 023 Identify potential 026 Recall that best source of range is a mounted range finder elevation for sun fro 028 Recall that range 024 Determine target 029 Use map symbol Operate tire Table FT-165-Al targets range 014 20. sketched, target identifiand quadrant elevation is accurately plotted, for Figure Position is occupi- As commander of a CEV crew Target area is accurately STANDARDS 19. CEV Gunnery Tasks position, paper, pencil, esstraight edge, and bino- ar culars, in davlight, in accombat, or during training of firing exercise Sector of responsibility is provided given a CEV at a firing TC may be assisted by CONDITIONS LEVEL JOB DATA WORKSHEET (TRADOC Pam 350-30) Gunner 4 18. 17. INITIATING CUES flection is based on azi-th influence readings with re on reference point Record quadrant elevation for Plot CEV's sector of res-sonsibility or area of fire ered is ent malatary and " In . I lareference point is flotted Signit retirence point in opy Firms Fositions elevation Identify targets on runge Secord deflection 2 (ecord quadrant mertania ren Record range search light card . .

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Pages				rset									T										T
Page 26aof Pages			NOTES	C2304 Determine target																			
			20.	C2304 Dc	range	-	-	-				-				1		-	_		-		
			19. STANDARDS			•																	
3)	DOS CEV Gunnery Tasks	LEVEL SL3																					
JOB DATA WORKSHEET (TRADOC Pam 350-30)			18.			-	-		-			+			+	-	1	+		+	1		
JOB DATA (TRADOC P.			17. INITIATING CUES																				
	12F	2. Occupy Firing Positions	16. IASK, ELENENTS J.P.M.																				
	3 TITLE	ry code	CODE	C3201	<u> </u>		 1	<u> </u>	 8-4	j	- 1-	_1_	-1	 .	 	.1	 	- !	<u>ц. 1</u>	 -1-	1	د_,	

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Page 27 of Pages			20. NOTES	030 Recall CEV capabili-	ties and limitations		031 Recall site selection	criteria for CEV	032 Parall that damerant	tareers may require im-	modiate engacement with-	out regard to firing	position															
	Tasks		19. STANDARDS	Positions selected provide	full coverage of sector of	responsibility for obser-	servation and field of	11rc	of available cover, con-	cealment	Most level firm surface	available is selected,	hull down where possible															
SHEET 50-30)	DOS CEV Gunnery Tasks	LEVEL SL3	18. CONDITIONS	As CEV commander, given a	CEV with crew, daylight of	dark, all weather condi-	tions, in combat or during	Ciarning of Hilling ever-	Sector of responsibility	has been assigned																		
JOB DATA WORKSHEET (TRADOC Pam 350-30)			17. INITIATING CUES	Assigned area is reached	or immediate fire mission	15 required																						
	12F	2. Occupy Firing Positions	16. IASK, ELEMENTS J.P.M.	Select Firing Positions		Consider sector of responsi-	bility and designate refer-	CHICA TO THE	field of fire		Consider cover and conceal-	zs at		Select primary position		Service directions (Cartering	Solver supplementary post-	tions										
	3 TITLE	TY CODE	ETEN CODE	202			•	,	;		e.	L.	;-4	3	I	;	ن		 	+	 		-4-	•		 _4	 	

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Pages 033 Use arm and hand signals to direct vehicle movement C3202 Select firing posi 030 Recall CEV capabili-Page 28 of P ties and limitations NOTES tion 1 20. route, with least exposure to detection and distur-STANDARDS CEV Gunnery Tasks weather conditions
In combat or during training or firing exercise Given a CEV with crew pre-Day or nightime under all paring to occupy a firing SL3CONDITIONS LEVEL DOS position JOB DATA WORKSHEET (TRADOC Pam 350-30) 44.44 18. Direct mayor at into a firing Firing position has been INITIATING CUES selected 17. the vehicle to position, or rect loader to guide Determine best route to posilesignate position to driver proper arm and hand sig-Occupy Firing Positions INSK, ELEKENTS J.P.M. tiva 12F .6. 3C00 1 3 TITLE

CODE 13203

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Page 29 of Pages			20. NOTES	001 Recall location of	switches, controls and			On Operate breechblock	operating handle	Old Recall ammunition	safety cautions and warm	sut		016 Recall mistire pro-	redures		020 Drive CEV in daylight	or dark		034 Recall elements of	fire command	035 Operate CEV intercom	system		038 Recall techniques for	target detection		C1302 Detect and identify	tarpets		C1201 Move into firing	position		C1101 Perform misfire
	y Tasks		19. STANDARDS	Necessary actions in	response to fire command	elements are taken rapidly	and accurately		Observe performance																									
жsнеет 350-30)	DOS CEV Gunnery Tasks	LEVEL SL1	18. CONDITIONS	As loader or driver in a	CEV crew, given a CEV in	combat or during a tiring	exercise, during daylight.	target is visible	Maingun is boresighted																									
JOB DATA WORKSHEET (TRADOC Pam 350-30			17. INITIATING CUES	TC announces "GUNNER-HEP"																														
	12F	3. Engage Targets	6. TASK, ELEMENTS	Respond to a fire command	(av leader or driver)		(DTIVER) If moving, selects	firing position, and position	march hall ericuted tewards		begroes for round bursts,	reports sensings		(LOADER) Check turret ring	and insure it is not locked		load maingum, check safety	writch is set to TIRE, stand	clear, and announce "UP"		repare to reload													
	B TITLE	TY CODE	LTEN	1001		1	i	<u>1</u> .	<u>-11*</u>	1	2.		i – 4		1	_1	. <u>.</u>		<u>1</u>		۰.	 _1	1	_1	_1	_1_	i	_1	_1	_!	_1	-1	_1	

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		JOB DATA WORKSHEET (TRADOC Pam 350-30)	SHEET 50-30)			TABO TABO TABOR
108 TITLE	12F		DOS	CEV Gunnery Tasks	y Tasks	
NTY CODE	3. Engage Targets		LEVEL	SL1		
LTEN	16. IASK, SLENENTS J.P.M.	17. INITIATING CUES	18. CONDITIONS		19. STANDARDS	20. NOTES
C1301						procedures for maingun
						C1103 Load the M-136
						maingun
			,			
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	ייי ייייי אונטי ליייי אל איייי אונטי אינטי אונטי אינטי אונטי אינטי אינטי אינטי אינטי אינטי אינטי אינטי אינטי אונטי אינטי		Bre. 211 e 411 Tre no	**************************************		

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	,	JOB DATA WORKSHEET (TRADOC Pam 350-30)	XSHET 350-30)		Page 30 of Pages
	12F		DOS CEV Gunnery Tasks	/ Tasks	
щ	3. Target Engagement		LEVEL SL1, 2 and	3	
HEM CODE	16. TASK, ELEMENTS	17. INITLATING CUES	18. CONDITIONS	19. STANDARDS	20. NOTES
1302	letect and identify targets	Target engagement is emi-	er of a CEV crew,	Identify all vehicles pre-	023 Identify potential
·	Swarch outstand to 100 morest	nent or underway	in a CEV, in compat or	sented in TEC lesson	targets
;	hands to detect target		exercise, sufficient	le Recognition) by type	037 Recall best method
					of destruction for tar-
	(man made) and terrain dis-		Detect and identify target	error, within 25 minutes	ket types
	turbance to que targets			(note: training standard)	038 Recall techniques
				ı	
ب	hotate observation duties to			Field Standard:	
B - 4	reduce visual fathure				
				Identify all vehicles ob-	
. 7	Use the four cormon features;			served as being either	
	track/suspension switch,			triendly or hostile	
, .	turret, maingum, and cusola,				
	to identify vehicles				
. 2.	Classify stationary targets				
	to determine hest method of				
	destruction as:				
	eridres 0.11-0.0				
	Fillboxes and punkers				
	ביינים מוות במווויבים				
	Tire barricades, roadblocks				
	obstacles				
. • }.	Salid readblooks and barriers				
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JOB TITLE 12F DUTY CODE 3. ITEN CODE 16. C1303 UNE	2.F				
		i	1 0S CEV Gunnery Tasks	Tasks	
7. m	. Target Engagement		LEVEL SL1		
	TASK, ELECENTS J.P.M.	17. INITIATING CUES	18. CONDITIONS	19. STANDARDS	20. NOTES
<u>်)</u>	Operate CEV during 7.62mm	TC announces "GUNNER COAX"	As driver in a CEV crew in	Vehicle is positioned to	020 Drive CEV in day
	coux MG target engagement		a CEV, in combat or during	hest facilitate engagement	or dark
<u>니</u>	From the stop-observe assigned			TC commands are rapidly	031 Recall sire sele
as	sector, await order to move			and accurately executed	
2. On	On the move-slow down and				034 Recall clements
	maintain a steady speed and				fire command
<u>3 </u>	direction to provide a stable				
<u> </u>	iring platform	,			035 Operate CEV inter
3.	directed or for moving				system
	target come to a shootly stop				
<u> </u>	at designated location				C1201 Move into a fix
					position
<u>ુ</u> •	continue to observe assigned				
3	sector				Cl301 Respond to a f
i					command
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Page 32 of Page: Cl105 Load the 7.62mm coa C1106 Load the 7.62mm coa MG (N-73) Cl301 Respond to a firing Old Recall ammunition safety cautions and warn elements of a 035 Uperate CEV intercom loading pro-CllO7 Apply immediate action to reduce a stop page in the 7.62mm MG Olf Recall misfire pro-049 Recall loading redures ror 7.6cmm 034 Recal1 MG_(N=240) cedures ings Coaxgun is serviced allow engagement STANDARDS CEV Gunnery Tasks 19. TC announces "GUNNER-COAX" As loader in a CEV crew
in a CEV, in combat or
curing a firing exercise SL1 CONDITIONS Coax is loaded LEVEL D0S JOB DATA WORKSHEET (TRADOC Pam 350-30) 17. INITIATING CUES Check that turret ring is not obstructed Cheek that wearon is charged and ready and salety is in the FIRE position Eunition box and receiver of zun betore and during firing inches of slack between am-Encage (arrets vit) 7 62mm coan No (as loader) on command "CLASE FIRE 3. Target Engagement TASK, ELENENTS ace weapon in SAFE. dn., abunouus 12F ECCO KING JOB TITLE MET! 01304 i 4 ٠, ci

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Page 33 of Page 037 Recall best method of 038 Recall techniques for C1302 Detect and identify 034 Recall elements of a intercom 014 Operate fire control 036 Operate maingun con-016 Recall misfire proswitches, controls, and 023 Identify potential 001 Recall location of destruction for target target detection 035 Operate CEV system NOTES indicators equipment tarrets cedures targets trols types 20. Necessary actions, in response to fire command element are taken rapidly and accurately STANDARDS CEV Gunnery Tasks As gunner in a CEV crew in During davlight, target is a CEV in combat or during Maingun has been boresight a firing exercise SL2 CONDITIONS ed and zerocd LEVEL visible JOB DATA WORKSHEET (TRADOC Pam 350-30) 41.5 18. INITIATING CUES TC announces ok through sights to locate and press firing trig hen IC announces range, eleed until fire mission is terdirected "TRAVERSE", trantil IC announces "Sitabi" "Off". When target is visually acquired announce Respond to a firing command sight picture and alignment Jate fun to obtain correct Insure turret power is 03 urn on maingum firing Slow traverse until TC TASK, ELENERTS J.P.M. Y CODE 3. Target Engagement heerve for (as runner) รองแบบเรา <u>brooss</u> TITLE 12F

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A state of the sta		, s		19. STANDARDS																					
مناهده منطقات مكتباهنة وتوا	NEET 50-30)	DOS CEV Gunnery Tasks	LEVEL SL2						,																
	JOB DATA WORKSHEET (TRADOC Pam 350-30)			17. INITIATING CUES																					
		1-1	3. Target Engagement	IS																					
		B TITLE 12F	(4)	ITEM CODE 16.	1301	_1_	上	1_1	 _1_	 B-:	[_] 52	_1	1_	_!_	1.	1_		1	<u></u>	_1_	<u>I_</u>		 1.	1	

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		JOB DATA WORKSHEET (TRADOC Pam 350-30)	(SHEET 350-30)		Page 34 of Pages
3 TITLE	12F				
3000 AJ	3. Target Engagement		LEVEL ST	Idaks	
TEN TOOP	:TS	17. INITIATING CUPS			
2307	J.F.M.	COO DUITING	constituis		20. NOTES
. 20	of west litty (as connect)	-+-	As gunner in a CEV crew in	Completes necessary action 001	001 Recall location and
		hi initial TC commond of	a CEV, during period of	- 1	Innction of switches,
-;	Turn on turret power and	"GRANTER-HEP"	Limited Visibility or dark-	within 10 seconds	controls and indicators
	maingun switch		firing or training exer-		(1) (1000000 (1)
,					ora operate title control
ri	Traverse to announced de-		,		edutpment
	flection, read back deflec-		Maingun is boresighted and		Olf Barall michigan
	tion		6 1		coduras
. •	20 000 4000 10 400 400 400 400 A				
	guardine creat		Range card has been prepared		023 Identify potential
B-°	read back quadrant clumation				tarpets
53	i				
.4	After command "FIRE" announced				024 Determine target azi-
	"ON THE WAY", Wait one second.				muth
	and press firing tripper				- 1
•					ond necall clements of a
۶.	Observe for burst				iire command
	If required, adjust against				035 Operate CFV intercom
	and elevation from subsequent				system.
	fire commands until fire				
	mission is terminated				036 Operate maingun con-
(trols
	If target is illuminated,				
	continue engavement with				017 Recall best method of
	direct fire sights until en-				destruction for target
	ragement is reminated				Lypes
					C. 301 Respond to a firing
					Command
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Page 34aof Pages LATE			NOTES	re a	nge card																			
Pag LhT			20. NO	01 Pr	circular range card																			
	y Tasks		19. STANDARDS				•																	
	CEV Gunnery Tasks																							
<i>XSHEET</i> 350-30)	DOS	LEVEL	18. CONDITIONS																					
JOB DATA WORKSHEET (TRADOC Pam 350-30)			17. INITATING CUES																					
	12F	3. Target Engagement	16. TASK, ELEMENTS																					
		41	ITEM	l					 В-	54		 •	•	•					•	•	•	 	 	

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			DOS CEV Gunnery Tasks	Tasks	
	3. Target Engagement		LEVEL SL2		
רטינ	TS	17. INITIATING CHES	18 COUNTITIONS	044,444,170	
C2303 111mmi	20,17	E	io: conditions	- 1	20. NOTES
	Coorch johr (30 cmms-1)	SULL	As gunner in a CEV crew,	All elements of firing	001 Recall location and
	Couling Cas		in a CEV in combat or	command are properly	function of switches,
1. Turn o	lurn on turret power		ing evercise, during a	Designated target is illu-	controls and indicators
			period of darkness	minated	014 Operate fire central
	traverse to announced deflec-				equipment
1011	cion, ledd back dellection		Searchlight is mounted		
3. Set du	Set quadrant elevation on		and boresighted		023 Identify potential
ــ	Subditant, Zero bubble, read		nampe card has been pre-		targets
1	Cack quadrant elevation		, at ea		
-55					U34 Recall elements of
	After TC announces "ILLUMINATH	L.			a fire command
TOVE L	move the searchingnt head on				
to the	to the center of the target				USS Operate CEV intercom
area					system
_1					
5. Traver					Use Uperate maingun con-
Knu as	Eun as directed by IC				LIOIS
					038 Recall techniques for
					target detection
					041 Recall techniques for
					searchlight employment
					-143 Use appropriate sight-
					ing equipment for black
					light
					C2301 Respond to a firing
					command

Page 35a of Pages C2201 Prepare a circular NOTES range card 20. STANDARDS CEV Gunnery Tasks 19. 18. CONDITIONS LEVEL DOS عبالهائدة JOB DATA WORKSHEET (TRADOC Pam 350-30) 17. INITIATING CUES 931. --- 2 OB TITLE UTY CODE CODE CL303 B-56

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1. TASK ELECATE 1. INITIATING CUES 18. COUDTIONS 19. STANDARDS 19.	OB TITLE	12F			Tasks	
16.	UTY CODE	3. Target Engagement				
High base legistic range of target is designated a TGO register to nearest 50 neters range of target from a virial bill of late engagement of 10	ITEN		1	18. CONDITIONS		20. NOTES
1. Hi available, eriain tippet diate enginement or for or during allining or considered by the considered diate enginement or for during a considered by the considered with a diate entry on range card (training exertise) The considered by the considered considered with a considered by the considere	5304	Determine target range	A new target is designated	As TC or gunner in a CEV	Determine range of tar-	Recall location and function of suitches,
Figure from a vehicle with data entry on range card training exertise Figure from a vehicle with data entry on range card training exertise Figure from a vehicle with figure Sear recards exister to make the figure of the figure for a figure from the figure for a figure from the figu		If available, obtain target	diate engagement or for	or during a firing or	to nearest 50 meters	controls and indicators
For inciding controllers of the first of the following scale of the first of the following scale of the first		runge from a vehicle with	data entry on range card	training exercise		
2. Set recite science for miles 2. Set le califor science for miles 2. Seal, ca foot telecente 3. Teasure target leaput in miles 4. Estimate target neight in miles 5. Mile komen herieure al teaput 6. Te estimate target of targets 7. Rame with somen herieure and 6. Te estimate target of targets 7. Rame with somen herieure and 6. Te estimate target of targets 7. Rame with somen herieure and 6. Te estimate target of targets 7. Rame with somen and width 7. Rame with somen on target and 6. Te estimate target of targets 8. Extimate target of targets 8. Extimate target of targets 9. Te include target and 9. Te target target target target and 9. Te target tar		ronging calleility or			For hasty estimation (foot-	ſ
Scale on 1001 telescence Scale on 1001 telescence Scale on 1001 telescence Teagung capability (such as Medical and as Medical and as Medical as Medical telescence Estimate target height in mile Estimate target height in mile Scale of termination Scale of telescence Scale of telescence To make target height in mile Scale of termination Scale of telescence Scale of telescenc	•			Binoculars are available	hall field method) to	equipment
3. Transity called the phit in mile as N-OU tank) may no active talled the phit in mile as N-OU tank) may no active talled to talled the phit in mile as a net make final range and active talled to talled and active talled tall	.;			Vehicles equiped with a		015 Install/dismount and
4. Estimate taivet keipht in mile as N-60 tonk) may be available for assistance 4. Estimate taivet heipht in mile available for assistance 5. Estimate taivet heipht in mile determination meters 6. Estimate taivet heipht and interest in the state of taipets and include tonge of taipets with known horizontal width. 1. Cestimate fone in the state and include formula or Rance with .30 cal Mi by placing round on target and include formula or Rance with .30 cal Mi by placing round on target and include formula or Tending round on target and adjustic retries without Advantage assisting cochail field deputh as base of over Son extens, select halfway Son extens, select halfway		2007 100 100 100 100 100 100 100 100 100		ranging capability (such		stow direct fire sighting
4. Estimate third helphi in To makes final range To estimate third helphi in To estimate third helphi To estimate thir		Negaure target height in mile	3	as N-oO tank) may be		edarbment
4. Estimate tativit helyint in feeters meters 5. Apply Mail Idensia to 1811- after range of targets with known horizontal width, use binocular mil scale and apply Most formal of targets kange with 50 cal Mi by placing round on target and rading range from Mi tallitate ratief of the Wilson Alselecing round on target and rading range from Mi tallitate ratief of the Wilson Alselecing round on target and state of the Wilson tallitate from Mi tallitate ratief of the Wilson symmatic notation out to Sin active, estimate 100 Someters, select halfway Someters, select halfway				available for assistance		
5. Application to test— figure France of targets for estimate France of targets for it estimates for it est	.57	Estimate target neaght in				U25 Use binoculars and
Agrily Muckl Introduct to using and mare range of targets Le estimate range of targets Le estimate range of targets use binocular mil scale and apply Mokk formata or Range with .50 cal Mib by placing round on target and target a	7	Deters		TC makes final range		WORN formula to estimate
mare range of To estimate range of targets With known horizontal width, Use binocular mil scale and apply WORM formala or Range with 50 cal Mi by placing round on target and rading range from Mih tallighte reflect or Ear immediate fire without dividing negition, out to 500 metars using football field longhat as buse. Over 500 meters, select halfway				determination		range
Late range of To estimate tange of targets With known horizontal width, use binacular mil scale and agply work formala or Range with .50 cal Mi by placing round on target and riding range from Mih tallighte rense from Mih tallighte rettel of Tor immediate fire without disclosing position out to Son meters actimate 100 segments using football field length as base. Over 500 meters, select bullway	5.	April General to esti-				
With Known torrace of turpets With Known torraced width, Use binocula within scale and Use binocula scale and Use binocula scale and Use binocula or Range with .50 cal Mi by placing round on target and reding round on target and reding round of tree line in immediate from Mih in immediate from the control of in immediate from out to Som meters, selection, out to Som meters, select haliway		mate range or				
Note the tange of targets With Room Nortzental width, use binocular mil scale and apply GORY formula or Range with .50 cal Mi by placing round on target and rading range from Mih talliging relief or For immediate fire without for immediate fire without for immediate fire without fire scale of the formulate of the fire without fire contains a formulate of the fire fire without fire langer as a formulate of the fire fire without fire langer as a formulate of the fire fire without fire langer as a formulate of the fire fire without fire langer as a formulate of the fire fire fire fire fire fire fire fir						source of range is a tank
With known horizontal width. Use binocular mil scale and Use binocular mil scale and Use binocular mil scale and Edite with .50 cal Mi by placing round on target and ruding round on target and findiate fire without findiate fire without Soon metaliane, out to Soon metaliane, out to Soon metaliane, select hilitany	.9					mounted range linder
Name with .50 cal Mi by placing round on tarpet and redding rance from Mih talliatic reticl or For immediate fire without firelesing restriction for immediate fire without firelesing restriction for immediate for out to 500 meters, select haliway		with known horizontal width,				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Kange with .50 cal Mi by Range with .50 cal Mi by placing round tarpet and rading round from 19h talliatic retrel or Extinuitate fire without fixelesing position, out to 500 meters assimate 100 superior using onthal field length as base. Over						038 Kecall rechildnes for
Range with .50 cal Mi by placing round on target and reding range from Nih tallistic reticl, or far immediate fire without farlesing pesition, out to 500 meters, using toothall field length as base. Over 500 meters, select haltway		apply Work formula or				target detection
placing round on target and redding round on target and redding roune from 13h tallistic reticl, or far immediate fire without far immediate fire without for cention, out to 500 meters, using football field length as base. Over 500 meters, select haltway	,	Range with 50 cal Mc by				045 Operate external
reading range from 33h initial retiel of for immediate fire without disclosing position, out to 500 meters, colimin, 100 sometia using football field length as base. Over 500 meters, select haltway	:	placing round on target and				radio communications
For immediate fire without For immediate fire without disclosing position, out to Sign access, catimate 100 Sygnets using lootball field length as base. Over 500 meters, select haltway		reading range from 336				
Tar immediate fire without disclesing position, out to 500 meters, usitiontaly 100 Symmetrs using the control of the control o		ballighte refielt of				046 Estimate 100 meter
The immediate fire without disclosing resition, out to Sign meters, restance 100 Sign meters, restance 100 Sign meters as base. Over Sign meters, select haltway						range using football
disclosing position, o 500 moders, motimate 1 segments using footbal field length as base. 500 meters, select bal	00	For immediate fire without				field method
SOO recers, selimate 100 Segments using football field length as base. Over 500 meters, select haltway	5	disclesing position, out to				
Supments using football field length as base. Over 500 meters, select haltway		500 morers estimate 100				
field length as base. Over 500 meters, select haltway		Segments using football				
500 meters, schect hultway		field length as base. Over				
		500 meters, select hultway				Manager of the Property

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			20.			-	-		-		-		\downarrow	1			-			-	-	L			+	-	-	
	asks		19. STANDARDS																									
	DOS CEV Gunnery Tasks	LEVEL SL2/3	conditions					,											***************************************									
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	12F	3. Target Engagement	16. TASK, ELEMENTS 16. J.P.M.	point and football field	rethod																							
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		JOB DATA WORKSHEET (TRADOC Pam 350-30)	SSHEET 350-30)		Page 37 of Pages
OB TITLE	12F		DOS CEV Gunnery Tasks	Tasks	
ELE CODE	3. Target Engagement		LEVEL SL2/3		
KELI	က	17. INITIATING CUES	18. CONDITIONS	19. STANDARDS	20. NOTES
C2305	Engage stationery targets	Target engagement is under	Ш	Obtain second round hit	001 Recall location and
	with maingum using Burst-on- Target (BOT)	hare first round misses,	or during a firing exer-	within 20 seconds for at	function of switches,
	Note: Procedures for either	or by TC	cise	ביים ביים ביים ביים ביים ביים ביים ביים	במורוסדה יווות דווחון ידרסו ה
	runner or TC, whoever senses		larger is visible	•	014 Operate fire control
	turst)				equipment
,			Maingun 15 boresighted		
	need sight on attention point		and zerved		Olo Recall mistire proce-
I			Carrest has been during		dures
; B-5	nasunce the senting 1.e.,		identified and 18 under		024 Determine target ani-
9	"SHORT - B-0-TH		ยทิธิภายตะกร		
,					
નું ન	lecation of burst recones the				1 025 Use binoculars and
	bor arming raint				KoRu formula to estimate
•					range
, ,	Accestion gun so that gol				
	100 000 000 000 000 000 000 000 000 000				0.34 Kecail elements of a
	13.				ire command
'n	er announces				035 Operate CEV intercom
	anneunce "ON IME WAY" and				system
	press firing tripper				
,					036 Operate maingun con-
;	received Continue to repeat				trols
	3				7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	destroyed. If sensing is				destable of merned of
	"10st" announce "hRQP 100"				ניינים ביינים ואו רייונים ביינים ביינ
	and continue to engage				
					C2301 Respond to a fire
7.	TC reminates engagement by commanding "CFASE FIRE"				command

Page 37 a of Pages Issue a fire com-C2304 Determine target SELON C330I Fand range STANDARDS CEV Cunnery Tasks .6: \$1.273 CONDITIONS LEVEL DOS JOB DAIA WORKSHEET (TRADOC Pam 350-30) 18. INITIATING CUES A and TASK, ELENTRIS J.F.M. Engagement 3. Target JOB TITLE פרב: כרכב TTEN COUS CL305 B - 6()

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	ĺ	JOB DATA WORKSHEET (TRADOC Pam 350-30)	KSHEET 350-30)		Page 38 of Pages
OB TITLE	12F		DOS CEV Gunnery Tasks	asks	
UTY CODE	3. Target Engagement		LEVEL SL2		
CODE	16. TASK, ELECTRIS	17. INITIATING CUES		90 STANATA	
C2306	Encape targets with maingum	and TC cannot use	funner in a CFV creat	3	- 1
	using rapid sequential round	COLLICA	in a CEV in combat or	within 20 seconds for at	function fo switches
;	Peccive change in deflection		during a firing exercise	least 80% of tareets	controls and indicators
;	in mils, repesition cun in	"105T"		engaged	
	deflection	TC initiates subsequent	Maingun 1s boresighted and		014 Operate fire control
•		fire command by announcing	000107		equipment
2.	Security change in range in	"SHORT" or "OVER" if	BOT correction cannot be		
	meters if BEP reticle is	observed	made afree provious rough		Olf Recall misfire pro-
8-	being used		DEBOT CROTTER TO THE		cedures
61					
۳.	heposition gun so that center				024 Determine target azi-
	of target is at new range in				muth
	sight reticle				035 1123 123 3
`	2				tion formal and
;	when it ambounces like.				moich formata to estimate
	announce Of THE WAY! press				range
	for burst knowing and on				034 Recall elements of a
٠,	If sensing is "LOST", and				035 Operate CEV intercom
	IC does not issue a subse-				system
	guent fire command, automati-				
	cally drop 100 meters in				036 Operate main gun con-
	range and fire				trols
					027 8.2.11 1.2.2
ċ	Confinal Process until TC				OS) NECALL DESC METHOD OF
	terminates engagement				destruction for target
					sada
					C2301 Respond to a fire
					command
Tan 1160	(041,011)	T			

Page 38th Pages C2304 Determine target NOTES Tange 1 20. STANDARDS CEV Gunnery Tasks .61 SL2 18. CONDITIONS LEVEL DOS JOB DATA WORKSHEET (TRADOC Pam 350-30) INITIATING CUES 3. Target Engagement
TASK, ELLIGHTS
6. J. P. M. 12F . 6. OB TITLE UTY CODE ITEM CCDE 02306 B-62 Page39 of Fage: safety cautions and warn-ings 032 Recall that dangerous 030 Recall CEV capabiliti es and limitations ment techniques for machir Fun engagements 052 Recall target engage-014 Operate fire control equipment C2301 Respond to a firing command UJS Operate CEV intercom mediate engayement withand target area is covered controls and indicator 010 Recall amounition 034 Recall elements of 001 Recall location function of switches out regard to firing NOTES fire command positions system 20. seconds of initial cormand Firing commences within 5 STANDARDS within 20 seconds CEV Cunnery Tasks 19. As the gunner in a CFV crew in a CEV, in combat or during a firing exercise
During daylight
7.62mm coax NG is mounted,
boresighted, zeroed and SL2Target is visible CONDITIONS LEVEL DOS JOB DAIA WORKSHEET (TRADOC Pam 350-30) loaded 18. TC announces "GUNNER-COAX" INITIATING CUES 17. Use appropriate target engage ment technique firing 20-25 Search through sight for target, announce "IDENTIFIED" for moving targets use initia Set turret power and machine gun switches to UK point "FIRE" announce 6. TASK, ELENGHTS
J.P.M.
Engage targets with 7.82mm
coax Mo (as punner) Estimate target ranges, and reticle for area or moving adjust gun for azımutlı and lead of 5 mils, and adjust and commence " observing strike or as Upon command "CEASE FIRE" se infinity signt for Target Engagement when target is seen irected by TC n command round bursts elevation nou 12F 3COD AI B TITLE CODE 2307

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ub the in (Suitabil) positioner

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Page^{39a}of Pages C2302 Detect and identify to targets C2304 Determine target NOTES range 20. STANDARDS CEV Gunnery Tasks 19. SL218. CONDITIONS LEVEL pos JOB DAIA WORKSHEET (TRADOC Pam 350-30) INITIATING CUES turn machine gun switch to TASK, SISTENTS J.P.M. 3. Target Engagement 12F 9. JOB TITLE DCTY CODE 17.EX COSE C2307 8-64

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		JOB DATA WORKSHEET (TRADOC Pam 350-30)	350-30) .		Page 40 of Pages
JOB TITLE	12F		DOS CEV Gunnery Tasks	asks	
DUTY CODE	3. Target Engagement		LEVEL ST3		
RELI	16. TASK, ELECTRIS	17. INITETING CUES	18. CONDITIONS	O CTANAL DAG	
C3301	Issue a Firing Command	A maingun target has been	Ac Tr in a cett	CONTRACTOR	20. NOIES
		designated	otton a CEU to cont.	Fire command is given in-	014 Operate fire control
1.	locate and identity target		during a firing exercise	Studing all elements with	equipment
·				Commands given until tar-	Olf Rocall magical
;	Alex Crew ov announcing		visible	set is destroyed	Codurace alst ite pro-
	THE WILLIAM STATES AND THE PARTY OF THE PART		Maingun has been hore-		
	Puscribe target ("LUMER"		sighted and zeroed		023 Identify potential
					tarvers
- i	Direct guaner to las gun in				024 Determine targets 323
1	actouth "TRAVERSE RIGHT				muth
3-6	(1.551)", "STIAN", "O:" (or				
65	use IC centrols to law pun)				
					mil formula to estimate
5.	Forthmate range and announce				runge
	in meters "LANGE 500" to				200
	politist 25 meters				OSC Recall CLV capabili-
					thes and limitations
. 9	Wait for loader to announce				2 2 2 2 3 1 3 1 3 3 3 3 3 3 3 3 3 3 3 3
	"The and runner to announce				tare come and
	105:41110				
7.	Command "FIRE"				U35 Operate CEV intercom
					System
89	Wait for gunner to announce				Usb Operate maingun con-
	"Or THE MAY" and observe				trois
					03/ Recall best method
.6	Assess damage or miss dis-				of destruction for target
	tance and correct as required				types
		*·			

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Page 10a of Pages C1302 Detect and identify tarpets 038 Recall techniques for target detection NOTES 20. STANDARDS 19. CEV Gunnery Tasks LEVEL SL3 CONDITIONS DOS JOB DATA WORKSHEET (TRADOC Pam 350-30) 38. 17. INITIATING CUES Terminate engagement unen target is destroyed TASK, ELEMENTS J.P.M. TY COUE Target Engagement 10. ITEN COLE C3301 B-66

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		JOB DATA NORKSHEET (TRADOC Pam 350-30)	SO-30) .		Page 41 of Pages
OB TITLE	12F		DOS CEV Gunnery Tasks	Tasks	
CIY CODE	3. Target Engagement		LEVEL SL3		
ITEN	.0	ין סמוס טעודגודואד לון	0.10		
330	J.F.W.	III INTITATING COES	18. CONDITIONS	19. STANDARDS	20. NOTES
	ed visibility (as TC)	range card has been directal	- 1	All elements of firing	001 Recall location and
		ed or determined		command are properly	function of switches,
1.	Identify target on range		City during a period or	annonneed	controls and indicators
	card		limited visibility or	Correct against and oned-	
r			darkness	7,	הפחזמשהטו
;	Supplied in mission by			-+-	
	THE CONTRACTOR		Range card has been pre-		Olb Recall mistire pro-
	to fact the feet the feet of the		pared		cedures
	TOTAL TOTAL COLD TOTAL				
			Maingun is boresignied		023 Identity potential
B-	Lamin Con Horrand Ton Some		and zeroed		targets
67	to the state of the state of the				
	Contract Con				024 Determine target
					assauth
5.	Verity deflection and quad-				Osa Recall elements of a
	rant elevation as read back				Tire command
	by gunner, and Loader says "up"	1.0			
					Uso Operate maingun con-
.	Command "LIKE"				tions.
7.	Observe burst, correct aim				U37 Recall hest method of
	as recusined				destruction for target
					types
ж ж	Assess domage and terminate				
	engagement then target is				C3301 Issue a tiring com-
	destroyed				mand
					C3201 Prepare range cards

odo Recall that CEV's
with searchlight mounted
should not fire because
of possible muzzle blast
damage to searchlight 038 Recall techniques tor Page: 035 Operate CFV intercon Olo Operate maingun con-UNA Recall elements of a 014 Operate lire control 039 Recall that CEV's mounting searchlights dinot fire while illuming ing because of smoke an function of switches, controls and indicators Recall location and U23 Identily potential Page 42 of dust obscuration target detection NOTES rdni biient targets trois 001 20. Correct scarch light cmployment techniques Correct azimuth and q rant elevation are re ed trom range card larger is illusinated Cautions and warnings All elements of fir command are properly STANDARDS lare observed announced rant elev CEV Cunnery Tasks 19. CEV in combat or during exercise during darkness Searchlight is mounted a training or firing As TC in a CEV crew Range card has been SL3 and boresighted CONDITIONS LEVEL DOS prepared JOB DATA WORKSHEET (TRADOC Pam 350-30) 8. Illumination mission directed or required INITIATING CUES Correct Searchlight position fortermine target deflection from range eard and announce fectoraine quadrant clevation from range card and announce Verify deflection and quad-rant elevation as read back card, and determine type of chounce "ILLETINIE" and appounding "GUNNER-WHITE LIGHT" (or "DIACKLIGHT") Set controls on A:/VSS-I centrol box for desired identify target on range Illuminate targets with searchlight (as TC) ELENCATS P.M. illumination required tern on searchlight Engage Targets 111 umination as required to runner to Enunei punnel 12F OB TITLE ECOD ALA ITEN CCCE ż ė. æ . **;** ∹ c; ۳.

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Page 42aof Pages Odg Recall that search-light must not be used in everdrive mare than ence every five minutes 044 Recall that CEV should nove to alternate position as soon as pos-C3301 Issue taring com-041 Rusall techniques for searchlight employ-043 Use appropriate sighting equipment for blacklight C3201 Prepare range cards NOTES Sible ригш 10.12 STANDARDS CEV Gunnery Tasks <u>ئ</u> SL3CONDITIONS LEVEL DOS JOB DATA WORKSHEET (TRADOC Pam 350-30) 1 441 ... 18. CUES INITIATING Į Terrinate mission when com-Tse correct searchlight TASK, ELENTINTS J.P.M. Engage Targets JOB TITLE DUTY CODE 10. ITEN CO1 E B-69

		JOB DATA WORKSHEET (TRADOC Pam 350-30)	KSHEET 350-30)		Page 43 of Pages
10B TITLE	12F		DOS CEV Cunnery Tasks	sks	
GCOO ALDO	3. Target Engagement		LEVEL SL3		
LTEN	h6. TASK, ELENENTS	17. INITATING CUES	18. CÓNDITIONS	19. STANDARDS	20. ROTES
C3304	Engage tarpets with maingun	Previous round error can	As TC in a CEV crew, in	Obtain second round hit	001 Recall location and
	using rapid sequential round	امّا	.ž	CEV in corbat, or auringluithin 20 seconds for at	10
		BOT, or sensed as "LOST"	iring exercise, target	least 80% of targets en-	controls, and indicators
			is visible	tared	
	ing from cunner or driver				014 Operate fire control
ci	Initiate subsequent fire		and zeroed		ednipacur
	command by announcing "SHORT"				Olb Recall mistire pro-
	er "OVER"		Target has been detected,		Cedures
			identified and is under		
,	Correct deflection by		engagement		024 Determine target
B-	announcing direction and mils				azimuth
- 70	e.g. "LEIT-2" or "RIGHT-3"				
					025 Use binoculars and
i					MORY formula to esti-
					שמנה במממה
	1.g. [60P 50] or [300 25]				
·	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				034 Recall elements of a
i	and leader annunces Tip"				fire command
	and "FIRE"				035 Operator CEV intercom
	3				System
ė	ontinue				
	corrections until target is				036 Operate maingun con-
	destroyed				trols
۲.	. di				037 Recall best method
	tion is more then 3 mils or				of destruction for tar-
	race mare than 200 meters				get types
	off command "CFASE FIRE" and				
•	issue a neu tire command to				047 Recall criteria for
• •	encase				size of range correction

]		مندع عدم مرخ ها وسيده من ما هذه و نور		
		JOB DATA WORKSHEET (TRADOC Pam 350-30)	350-30)		Page43aof Pages
B TITLE	12F		DOS CEV Gunnery Tasks	asks	
TY COLE	3. Target Engagement		LEVEL SL3		
NET C	i.5. Task, Elements	17. INITIATING CUES	18. CONDITIONS	19, STANDARDS	20. NOTES
707					
ဆ်	Assers garage and terminate				for serimmend range
	PA1010				doubled if miss is over
					100 meters)
					C3301 Issue a tire com-
					Puem
					1 100
					C. 304 Determine target
B					range
7 1					
-					

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Page44_of_Pages			NOTES	Recall location and	function of switches,	controls and indicators		010 Recall ammunition	salety cautions and warn-	8		Ul4 Operate lire control	הקטוף שהמל נוסס		Olf Recall misfire pro-	Cudures		030 Recall CEV capabili-	ties and limitations		032 Recall that dangerous	targets may require im-	mediate engagement with-	positions		034 Recall elements of a	fire command		035 Operate CEV intercom	system		050 Recall loading pro-	cedures for cal .50	machine oun
	asks		19. STANDARDS 20.	Open fire within 5 061	desig-	nation, and place rounds con	et within 20	seconds 010	-	Fire is continued until ings	nullit	fled or out of range Ul4	ინი		016	0.00		030	tie		032	tar	Double Transfer of the Control of th	sod		034	fir		03	SAS		1050	cec	-
RKSHEET 350-30)	DOS CEV Gunnery Tasks	LEVEL SL3	18. CONDITIONS	As TC in a CEV crew, in a	CEV in combat or during	a firing exercise		Cal . 50 MG is mounted.	boresiphted, zeroed, and	loaded, M34 or M36 is	installed																							
JOB DATA WORKSHEET (TRADOC Pam 350-30		٠.	17. INITIATING CUES	A .50 cal target is iden-	tified																													
	12F	3. Target Engapement	16. TASK, ELENTS J.P.M.	Engage ground targets with	cal .50 8-85 %6		Initiate engagement by announ-	C102 "CALIBER .50"			salety to FIRE, and rate	saiten to now		istimate target range and	lay you on that range line	is sight reticle, using azi-	muth and elevation centrols	tor carola	adaming promote \$ [out i] out if		7,77	Adjust tire by "malking"	tracers into target area		lerminate engagement by	announcing "TC COMPLETE"		Place safety switch to OFF						
	ii	a	CODE	53305	4		;		_	7.		-		.:	8-	- 7:	2	_1.	- 1 -	•		,	4	·1	ف	1	,			_•	-			_

052 Recall target engage-ment techniques for maching fun engagements Page 44aof Pages C3201 Prepare range cards C3102 Correct a stoppage of the cal .50 M-85 MG, using immediate action C3101 Load the cal .50 C3301 Issue a firme NOTES puerres 20. STANDARDS CEV Gunnery Tasks .9 \$1.3 18. CONDITIONS LEVEL 200 JOB DATA WORKSHEET (TRADOC Pam 350-30) 17. INITEATING CUES IASK, ELSTERITS J.P.M. 3. Target Engagement 12F OB TITLE CTY CODE ITEN CC:E 8-73

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		JOB DATA WORKSHEET (TRADOC Pam 350-30)	15HEET 350-30)		Page 45 of Pages
10B TITLE	12F		DOS CEV Gunnery Tasks	15k5	
SCOO MARK	3. Target Engagement		LEVEL SL3		
7311 6000	66. IASK, SLININGS	17. INITIATING CUES	18. CONDITIONS	19. STANDARDS	20. NOTES
C3306	Engage aerial targets with	Acrial attack is underway,	As IC in a CEV crew, in a	Aircraft is engaged before	001 Recall location and
	cal . 50 N-85 MG		E	passing over or post the	Iunction of switches,
		mander directs engagement	exercise M-85 is mounted,	CEV	controls and indicators
ä	Initiate engacement by	North of Actions	boresighted, zeroed, and		
	Carte Cart	change fareet	Toraced.		O.
;	Set cupola power to 03	or	Aircraft meets hostile		safety cautions and warn-
	safety switch to FIRE, and	Target meets hostile	criteria, and engagement		1088
	rate switch to HIGH	criteria under current con-	L.		Old Operate fire control
		trol measures	l		
;	Aim above and in front of				
	target and fire a continous				Ol6 Recall misfire pro-
B	tarst until target flies				
74	through cone of fire				
٠					030 Recall CEV capabili-
í	first series cont of the tasks				ties and limitations
	niche until target is des-				027
	troyed or out of range				fire command
٠,	Terminate engagement by				035 Operate CEV intercom
	announcing TC COMPLETE				system
9	Place safety switch to OFF				
					002 Recall target engage-
					ment techniques for
					machine gun engagements
					C3101 Load the Cal, 50 M-8'
					C3102 Correct a stoppage
					of a cal .50 M-85 MG
					using immediate action

					C3301 Issue a firing
					Command

Table Engagement	125	(1KADUC Fam 550-50)	DOS		
17. INITIATING CUES 18. CONDITIONS 19. STANDARDS 10. COAR Question and target is select— a CEV in combast or during seconds of initial command a firing exercise during and target orea is covered daylight 1.62mm coax NG is mounted, All commands are correctly boresighted, Zeroed, and Riven 1.62mm coax NG is mounted, All commands are correctly boresighted, Zeroed, and Riven 1.62mm coax NG is mounted, All commands are correctly boresighted is visible.	irget Engagement		1	Tasks	
coax gun target is select- As TC in a CEV crew, in Firing commundes within 5 ed or designated a (EV in combat or during and target area is consured a firing exercise during and target area is covered daylight 7.62mm coax NG is mounted, All commands are correctly boresthigh, zeroed, and given loaded Target is visible	TASK, ELECTIS	INITIATING CUES			
ed or designated a CEV in combat or during seconds of initial command a fixing exercise during and target area is covered daylishe and same correctly boresighted, zeroed, and given loaded Target is visible	e targets with 7,62mm		As IC in a CEV crew, in	Firing commences within 5	
daylight 7.62mm coax MG is mounted, All commands are correctly boresighted, zeroud, and given loaded Target is visible	C (31 ge) D	ed or designated	a CEV in combat or during		function of switches,
7.62mm coux MG is mounted, All commands are correctly boresighted, zeroed, and Riven loaded Target is visible	illy acquire target and		daylight	within 20 seconds	ימוניוסוט חות דוותוריתיסוט
Violum coux NG 18 mounted, All commands are correctly boresighted, zeroed, and given loaded Target is visible	ify				010 Recall ammunition
Target is visible	vel has "yestes-coak" te		Norestehmed zeroed and	All commands are correctly	safety cautions and warn-
Target is visible	nn target		loaded		0.1114
Target is visible					014 Operate fire control
			Target is visible		equipment
	THICK and estimated				1117
					ties and limitations
	receiving "UP" from load				
as and a second an	d "IDENTIFIED" from				032 kecall that dangerous
35 Dana	r, command "FIRE" and				targets may require im-
35	we fire				mediate engagement with-
35 Jnc					
3s fine					
36	in shortest possible				
36 200	3				
36 Jac	ss damage and terminate				fire command
	enent when taryet is				035 Operate CEV intercom
	goved, neutralized, or ou	ום			ever pa
	ange by commanding "CEASE				
machine gun cngagements machine gun cngagements C2304 Determine target range C3301 Issue a firing					052 Recall target engage-
machine gun engagements C2304 Determine target range C2301 Issue a firing					ment techniques for
C2304 Determine target ranhe (23301 Issue a fiting					machine gun engagements
C3301 Issue a firing					C2304 Determine target ra
C3301 Issue a firing					
					Angel 7 64-4-

APPENDIX C

OPERATIONAL SEQUENCE DIAGRAMS
FOR CEV GUNNERY

In order to facilitate evaluation of DORACs for assessing gunnery proficiency of CEV personnel, operational sequence diagrams (OSDs) have been prepared which depict the flow of activities performed in conduct of CEV gunnery tasks and describe the actions and interactions of crew members as activities are performed. Successful employment of the CEV as a demolition weapon depends on the extent to which the crew functions as a coordinated team. Thus, in order to be maximally useful, DORACs for CEV gunnery should provide for the assessment of CEV crew readiness. By comparing the OSD descriptions of crew requirements in gunnery task performance against the scenario and evaluation capabilities of various DORACs proposed, we can identify the DORACs that have the greatest ability to assess CEV crew readiness.

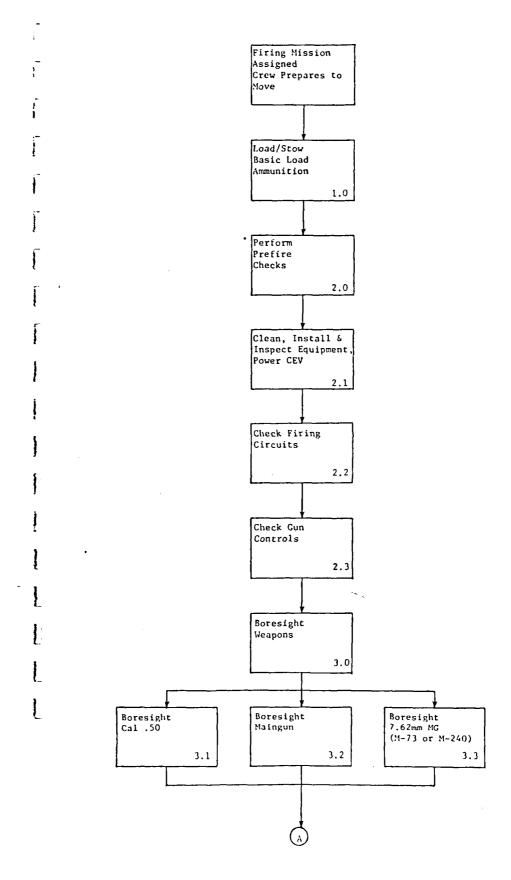
A master flowchart has been prepared which portrays the sequence of activities required in conduct of firing missions. Blocks 1.0 through 5.2-2 describe activities performed to prepare the CEV for a firing mission. Included in these activities are stowing the basic load of ammunition for the weapons systems, performing all checks of the weapons system, boresighting the weapons, and loading and zeroing the machineguns. Activities performed in conduct of various types of firing missions are presented in blocks 7.0 through 53.0. Firing missions are distinguished in terms of whether the CEV is firing from a predetermined firing position using a range card (blocks 11.0-13.0) or from a position taken while moving in support of a maneuver force (blocks 7.0-9.0) and on the basis of the weapon system employed: machinegun (block 15.0), searchlight (27.0), or maingun (32.0).

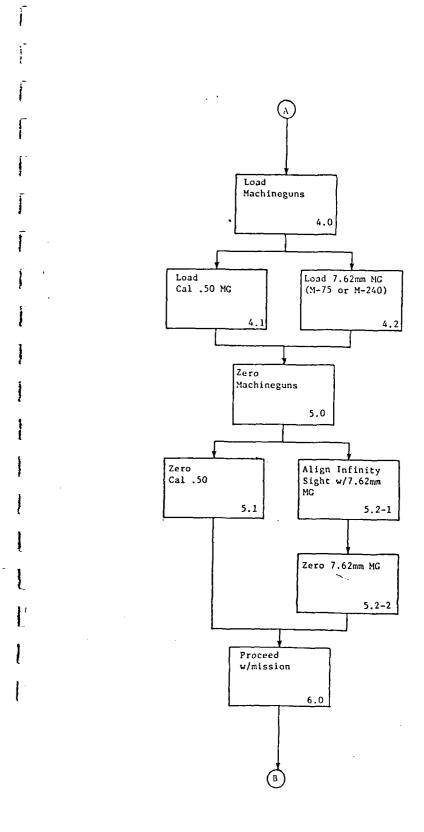
Combining various activity blocks on the master flowchart, seven collective tasks have been developed that encompass crew requirements for the gunnery portion of CEV employment. The seven collective gunnery tasks are:

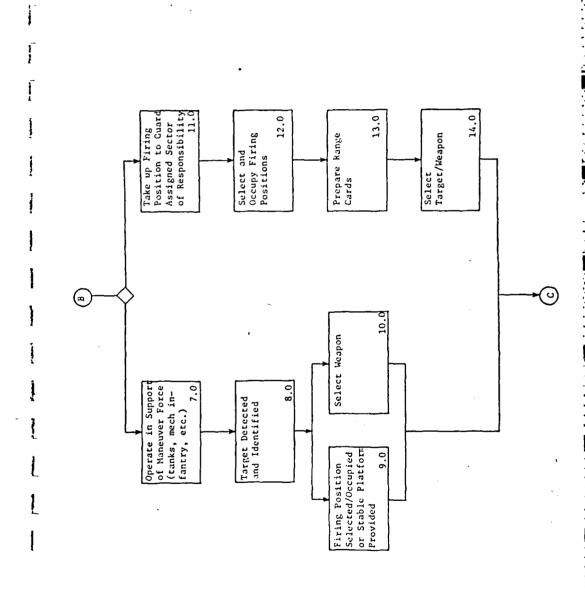
- 1. Preparation of CEV for Firing Mission.
- 2. Engagement of Targets with 7.62mm Coax Machinegun.
- 3. Engagement of Aerial Targets with Cal .50 Machinegun.
- 4. Engagement of Ground Targets with Cal .50 Machinegun.
- 5. Engage Targets with Searchlight from Predetermined Positions.
- 6. Engagement of Targets with 165mm Gun from Predetermined Firing Position

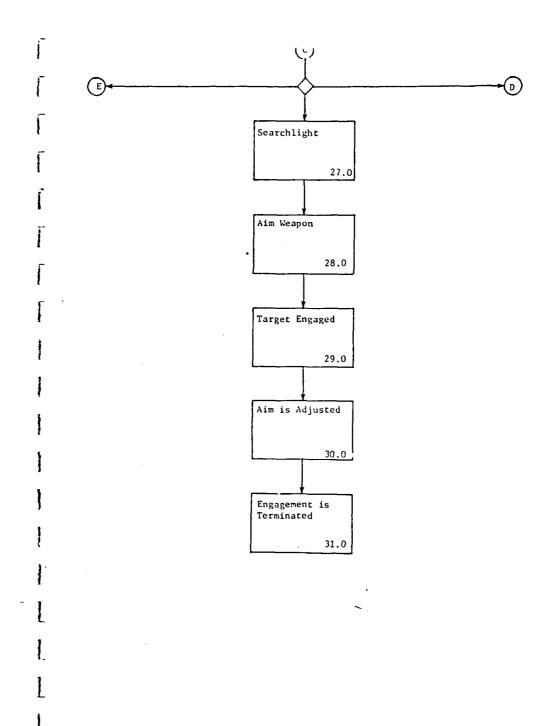
7. Engagement of Targets with 165mm Gun as Part of Maneuver Force. Task descriptions consist of a flowchart of activities performed during conduct of the task followed by verbal descriptions of actions performed by the different CEV crew members during task performance. Activities presented in a task flowchart are numbered in reference to activities in the master flowchart. The verbal description of task activities consists of four panels (one for each crew member) divided into a series of blocks. A description of a particular action performed by a crew member in performance of a task activity is provided in a block. In the lower right hand corner of each block with text is an alphanumeric dode which keys the action performed in the block to an activity in the task and master flowcharts (i.e., 5.0, 10.0, etc.), identifies the position of the action in the sequence of actions that accomplish the activity (i.e., 1st action, 2nd action, etc.), and identifies the crew member that performs the action (a=tank commander, b=gunner, c=loader, d=driver). For example, a block numbered 10.2c refers to an action performed by the loader which is the second action in the sequence of actions performed to accomplish activity 10. Note that actions described in a block can be a part of more than one activity.

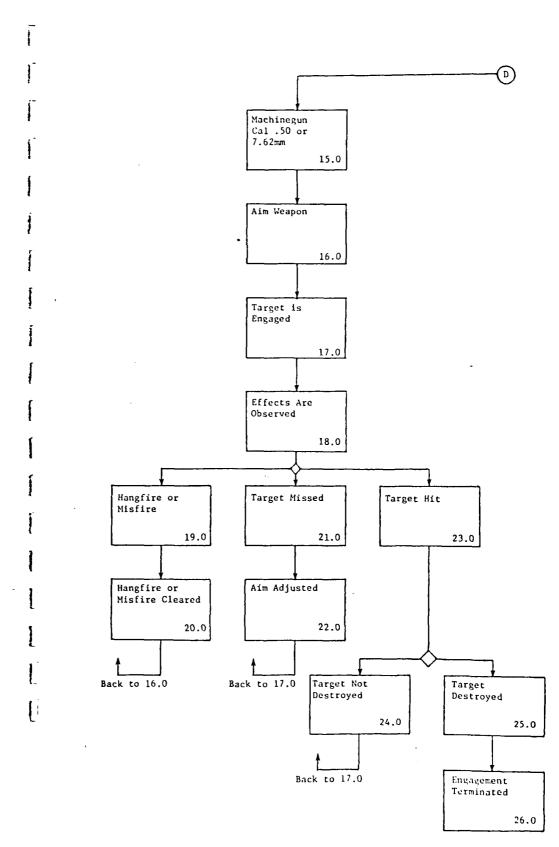
In the lower left hand corner of each block is another alphanumeric code in parentheses. The action descriptions p-ovided in the different blocks were taken from the individual task descriptions prepared earlier. The codes in parentheses reference an action to a specific individual task (first five digits) and element of that task (digits following the decimal).

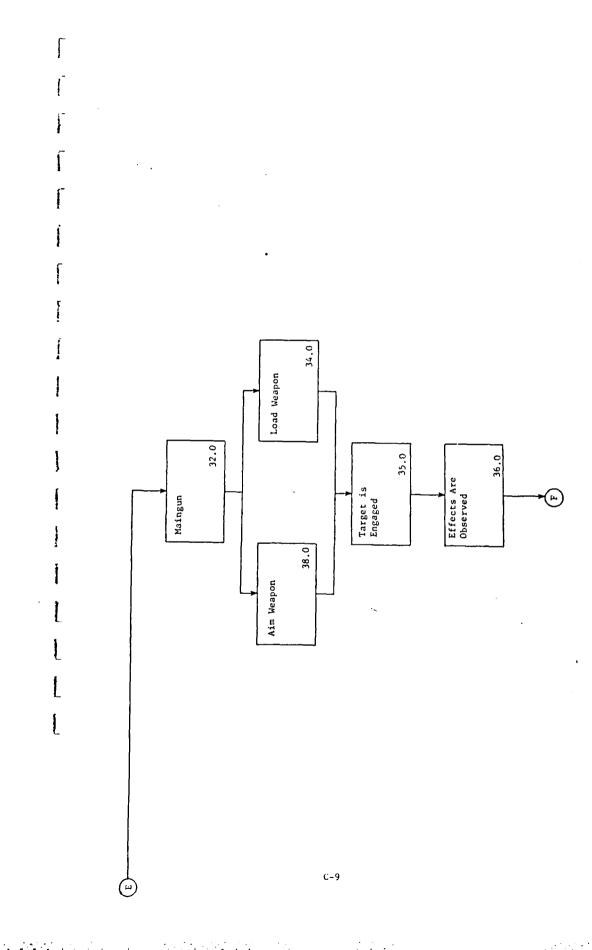


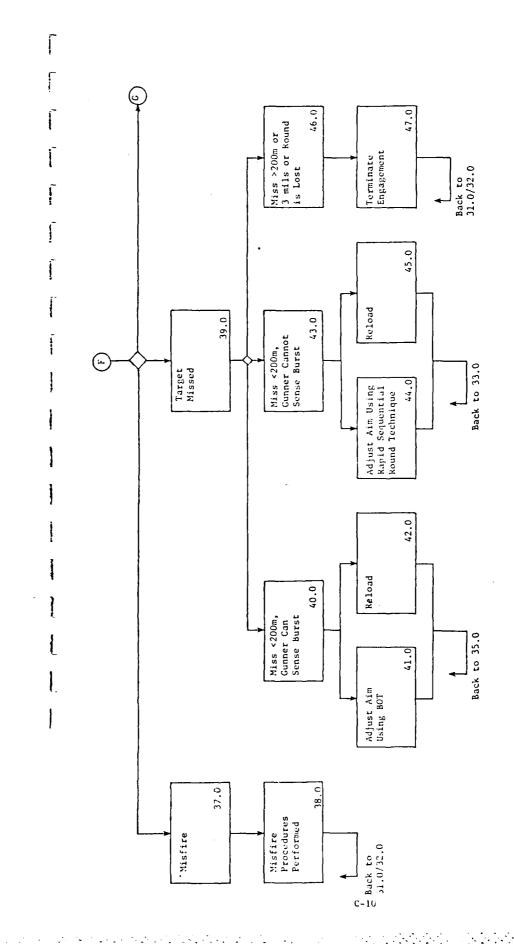






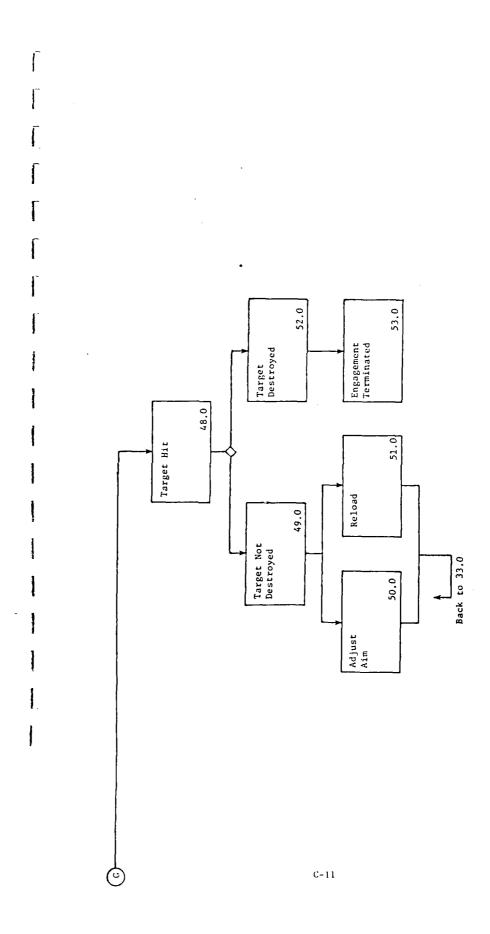


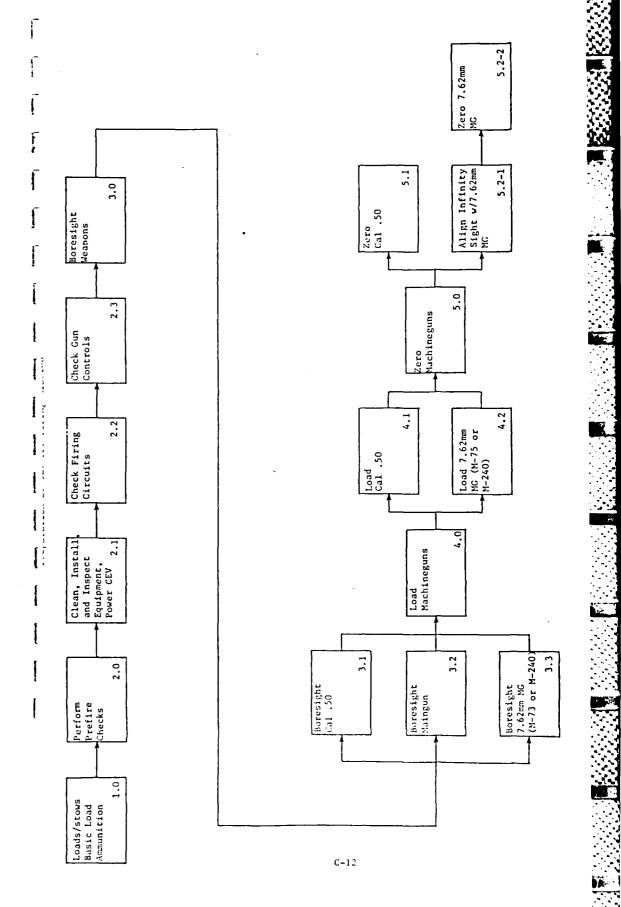




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Conditions: A CEV crew has been assigned a tactical mission in which use of weapons systems is anticipated.

Tank Commander			`.		•	
Gunner						
Loader	Installs and secures inner 165mm rounds in ready rack	Installs and secures Installs and secures Installs and secures inner 165mm rounds in 165mm rounds in the ready rack tready rack tubular stowage rack tubular 1/2, 10,10,10,10,10,10,10,10,10,10,10,10,10,1		Stows 6.62mm ammunition in hull and turret racks (C1104.2) 1.0.4c	Stows cal .50 ammuni- Stows cal .45 ammun. tion in hull and tion in turret turret racks racks (C1104.3) 1.0.5c (C1104.4) 1.0.6c	ammuni- Stows cal .45 ammui. nd tion in turret racks 1.0.5c (C1104.4) 1.0.6c
Driver						

		operation of Checks instrument itic shield lights and controls	3) 2.1.3b (C2001.4) 2.1.4b	MC m	tion for proper stor age, complete load, and serviceability	2.3) 2.1.3c (C1002.4/9) 2.1.4c	Closes hatch Positions master battery switch to "ON"		2,1.3d 2,1.4d
Checks M34 or M36 periscope	(C3001.3) 2.1.2a	Installs, cleans, and Checks operation of inspects direct fire ballistic shield sights	(62001.2) 2.1.2b (62001.3)	maingun		(C1002.2) 2.1.2c (C1002.3)	Lowers seat Closes		2.1.24
Cleans turret ex-	(C3001.2) 2.1.1a	Observes loader's check of replenisher indicator tape	(0.2001.1) 2.1.1b	enisher tape and	멎	(C1002.1) 2.1.1c	Cleans periscopes		2.1.14
"Prepare to Fire"	(C3001.1) 2.0.1a								
				Stows hand grenades		(C1104.5) 1.7c			
Tank		Gunner	-14		Loader			Driver	

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Tank Cormander		"Check firing switches"		Operate T.C.'s controls during test	"Check gun controls"	Checks gun control: for power elevation and traverse
		(C3001.4) 2.2.1a	,	(C3001.5) 2.2.3a	2.2.3a (C3001.6) 2.3.1a	2.3.1a (C3001.7) 2.3.
ы в в в в в в в в в в в в в в в в в в в				Operates gunner's controls during test		Checks gun control: power pack, oil ler and equilibrator hy draulic fluid level
				(C2001.5) 2.2.3b		(C2001.6) 2.3.2
	Switches radios OFF during engine start		Installs firing circuit tester	Operates loader's controls during test		N 0
Loader	(C1002.5) 2.1.5c		(C1002.6) 2.2.2b	2.2.2b (C1002.7) 2.2.3c		(C1002.8) 2.3.2
Driver	Starts engine		·			
	2.1.4d	•				

Tank Commander	"Check fire control"	Checks operation of Checks firing oper. Cal .50 MG mount and tion of Cal .50 MG controls	1	Removes body of N34 and M36 periscope	Places MG in "Safe" Removes back plate position and insures buffer group, gear that gun is unloaded assembly	Removes back plate, buffer group, gear assembly, and bolt assembly
	(C3001.8) 3.0.1a (C3001	(6.	(C3001.10) 3.1.2a	3.1.1a (C3001.10) 3.1.2a (C3002.1) 3.1.3a (C3002.2)		3.1.44 (C3002.3) 3.1.5
Gunner		azimuth indi- for accuracy ecks elevation int	Sets elevation/trav- Directs loader to erse power sultch and secure boresight maingun switch to OFF cord over muzzle and master battery switch to ON. Unlocks turret traverse lock	Directs loader to secure boresight cord over muzzle	orech bore-	
		(C2001.7/8) 3.2.1b	3.2.1b (C2006.1) 3.2.2b	(C2006.2) 3.2.3b	3.2.3b (C2006.3) 3.2.4h	3.2.4h (C2006.4) 3.2.5
Loader					Secures boresight cord over muzzle witness lines with tape	Assists gunner with boresighting
					(C1002.11) 3.2.4c	3.2.4c (C1002.10) 3.2.5
Driver						

		30 2000	Installs the M34 perit	Removes M34 and	Adiners alevation &	Pomoreog M36 hody	Reservables holt
		hilghs center of barrel w/aiming by	scope and adjust ele-	install M36 peri-	traverse until 500	Con con casoman	assembly, buffer
	Tank	manually positioning	til 500m aiming point	ecobe	meter aiming point is		group, and backpla:
	Commander	the cupola and engag-	is aligned w/aiming		aligned w/aiming point	•	
		ing the azimuth lock	point. Rotate slip scale on elevation &		Rotate slip scales on		
		(C3002.4) 3.1.6a	3.1.6a \frac{\text{deflection knobs to}}{\frac{\text{F3002.6}}{3.1.7a}} \frac{\text{C3002.6}}{(C3002.6)} \frac{\text{3.1.8a}}{3.1.8a} \text{(C3002.7)} \frac{3.1.9a}{3.1.9a}	(c3002.6) 3.1.8a	read 4 and 4 (C3002.7) 3.1.9a	3.1.9a (C3002.8) 3.1.10a	3.1.10a (C3002.9) 3.1.1
		Selects HEP reticle	Selects HEP reticle Installs and adjusts	Lays boresighted		M-75: Loosens 3 set	Remove electrical
		in 105F telescope and	visible light body	maingun on aiming		screws on outside	load from receiver
c	•	adjusts telescope ret	reticie for #32c perif	point		collar	receiver from jack.
-17	Gunner	icle to aiming point	body cover head, leav-	- <u>-</u> -	fiesthat gun is un-		assembly
,		and verifies bore on	ing 3/4 inch hole &		loaded & safety is in		
		aiming point 3.2 6h	(C2006.6) 3.2.7b	(C2002/3.1) 3.3.1b	ion	3 3.25 (C2002.3) 3.3.3b	(C2002.4) 3.3.4
				201016 (210/2000)			1
	Loader						
		:					
	Driver						

Tank Communder	Installs desired periscope body				•	
	(C3002.10) 3.1.12b		,			
Guaner	Loosens mounting screws, jam and locking nuts for vertical and horizontal adjustments (C2002.5) 3.3.5b	Loosens mounting Serews, jam and lock- ing nuts for vertical binoculars through and horizontal adjust- bore and align bore ments (C2002.5) 3.3.5b (C2002.6) 3.3.6b	Tighten mounting screws, locking and jam nuts, & re-assemble receiver. Reconstructs electrical luad (C2002.7) 3.3.7b	Tighten collar set screws (C2002.8) 3.3.8b	r set For M-240: Sets ele- vation/traverse switch to OFF, verifies that gun is unloadyd, and surety is in "sposi- tion, ensures bolt is 3.3.8b (C2002:2) 3.3.2b (C2003:3) 3.3.3b	M-240: Removes buffer, driver spring, mounting p slide rod, and bol assembly (C2003.3) 3.3.3b
Loader						
Driver						

	lon	3.3.8b	Removes boresight cord from muzzle or maingun	(C1002.11) 3.3.9	·
•	Return bolt to forward position	3.3.7b (C2003.8)			
	Reassemble machine gun				
	Reassem gun	(C2003.7)			
	Focus on aiming point Tighten mounting nut Reasurth sight side of 6 recheck bore align-gun M17Al binoculars ment through bore 6 align bore w/aiming point	3.3.6b			
	Tighten m & recheck ment	(C2003.6)			
	iming point side of culars re & align ing point	3.3.5b (C2003.6)			
		3.3.4b (C2003.5)		;	
	Lousens mounting nut 5 tightens to 1/3 turn past touching washer				
	Lousens mounting in 5 tightens to 1/3 turn past touching washer	(02003.4)			
Tank Cormander	Gunne r		Loader		Driver

Tank		Commands, "Load machine guns"	Raises cradle access With bolt in rear door and cover assem-position, checks that bly and latches it chamber is empty open		Closes bolt slowly	Places ammunition i feed box and feeds 3 or 4 rounds into flexible chure
		4.0.1a	4.0.1a (C210i,1) 4.1.1a	4.1.1a (C3101.2) 4.1.2a	4.1.2a (C3101.3) 4.1.3a	(C3101.4) 4.1.4
	Stows tools and equipment					
Gunner						
	(C2002/3.9) 3.3.11c					
Loader			Checks that traverse For hock is set to "Lock", ceive ELEV/TRAV PWR switch tray to OFF, and machine gun switch to OFF	1-75: Raises re- ir cover and feed	Sets safety to F (fire) and pulls charging handle to rear	Checks that barrel extension is back a chamber is clear, then lowers feed tr
			(C1105/6.1) 4.2.1c (C1106.2)	-	4.2.2b (C1106.3) 4.2.3b	(C1106.4) 4.2.4
Driver						

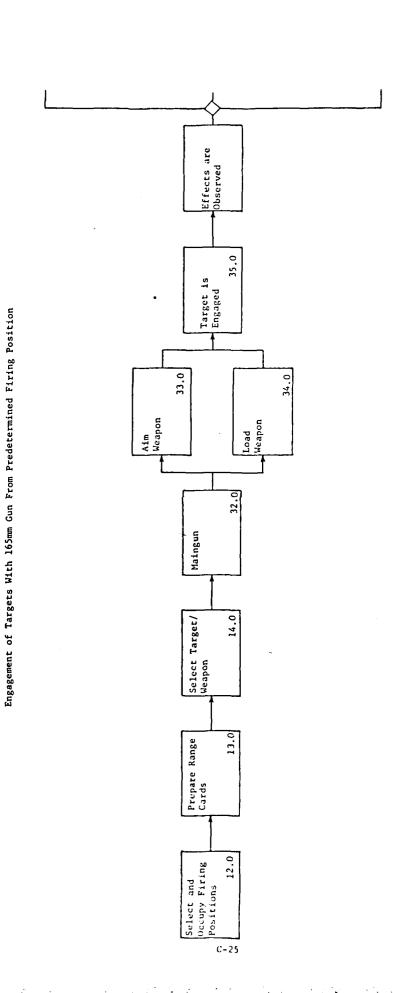
		th and	
		Closes late locks cover checks that are locked (Cl105.5)	
		For M-240: Pull Raises cover and feed Feeds ammunition belt Closes latch and charger handle to rear tray and checks that through chute, places locks cover, and sand sets safety to S chamber is clear. (safe) Lowers feed tray. Open side of link are locked down, and pushes apgainst cartridge stop Rainst Callos.2) 4.2.3c (Cllos.3) Raises cover and feed frough chute, places latch and checks that latches are locked down, and pushes apgainst cartridge stop Rainst Callos.5, 4.2.5c	
		Raises cover and feed tray and checks that chamber is clear. Lowers feed tray.	
,		nd For M-240: Pull ver charger handle to rear rd and sets safety to S (safe) 4.2.6c (C1105.2) 4.2.5c	
Closes cover assembly (C3101.6) 4.1.6a		90	
Feeds rounds through flexible chute and places lead round on tray w/open side of links down (C3101.5) 4.1.5a		through chute, places checks that cover and lst round in feed tray latch is forward wlst round over slot in feed tray (C1106.5) 4.2.5b (C1106.6) 4.2.	
Tank Commander	Guaner	Loader	Driver

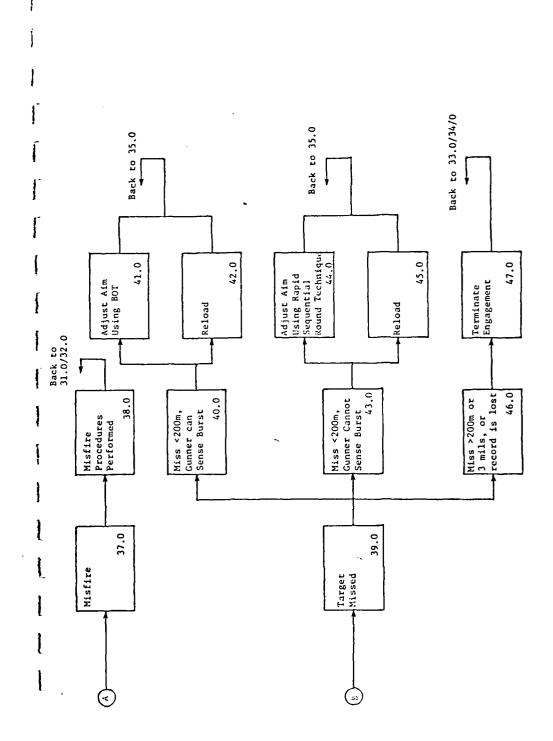
Tank Communder	Operates charger handle to recharge gun, places safety in the "S" position	Orders "Report"	Orders, "Driver move to firing range"	Ord. "Ze	Orders "Zero machine guns"	Uses M34 or M35 per scope to lay yun on 500 meter alming point by traversing
	(C3101.7/8) 4.1.7a	4.1.7a (C3001.14) 2.0.2a	5.0.1		5.0.3a	5.0.3a (C3003.1) 5.1.1
C-		Replys, "Gunner Ready"				Lays 7.62mm MG on atming point at 500 meters
Counter		(C2001.10) 2.0.2b				(C2004,1) 5.2-1.
		keplys, "Loader Ready"				
i apro-		7 0 2 0 2				
Driver		. Ready"		Driver maneuvers CEV to fiting range and positions CEV on firing line		
		2.0.24		5.0.24		

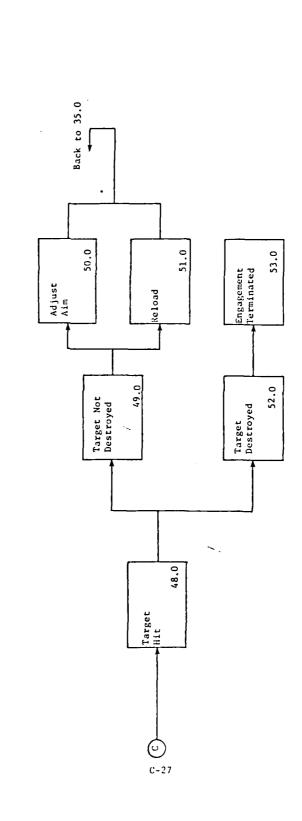
Tank Communder	Fires a 10 to 20 round burst	Checks lay on gun after firing and re- adjusts to alming point if necussary	scope ation iming	Fires another 10 to 20 round burst to confirm zero	Repeats procedure foulf preparing for nigli other periscope engagements, verifie- nonhallistic reticle aiming point of M36 periscope by firing in same target	If preparing for fight ungagements, verifie: nonballistic reficie aiming point of M36 is periscope by firing; burst at same target
	(C3003.2) 5.1.2a	(C3003.3) 5.1.3a		(C3003.5) 5.1.5a	(C3003.6) 5.1.6a	dusk or with searchli illumination (03003 7) 5 1 7
C-23	Sets master battery switch and infinity toggle switch to ON 6 adjusts infinity reticle brightness	Adjusts infinity reticle in elevation & azimuth to align reticle w/aiming point	Adjusts infinity. Lays 7.62mm gun on reticle in elevation 600 meter aiming point 6 azimuth to align using M3C periscope reticle w/aiming	Adjusts light intensity of infinity sight reticle	Fires 20-25 round burst	Without disturbing ge lay, uses infinity sight boresight knob: to center strike are: in the reticle
	(C2004.2) 5.2-1.2b	(C2004.3) 5.2-1.36	5.2-1.36 (C2005.1) 5.2-2.16	(C2005.2) 5.2-2.2b	(C2005.3) 5.2-2.3b	5.2-2.3b (C2005.4) 5.2-2.4b
Loader						
Driver						

Tank	Announces, "Cal ,50 zeroed"			•	
	5.1.8a		.,		
Louun9 C-24	Lays gun again to aim- ing point and fires another 20-25 round burst	Repeats process until burst is inside sight reticle	Announces, "Coax zeroed"		
	(C2005.5) 5.2-2.5b	(C2005.6) 5.2-2.6b	5.2-2.7b		
Loader					
Driver					

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Conditions: A CEV has been assigned the mission of guarding a particular sector of responsibility to deny enemy the use of transportation routes (bridges, tunnels, roads, etc.) or concealment (buildings, etc.)

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Tank : Commander	Considers sector of responsibility, observation and fields of fire, and cover and concealment	Selects primary posi- tion, alternate posi- tions and secondary positions	ts primary post- Designates firing alternate post- position to driver & and secondary designates route to fons		When required, dismounts and guides vehicle into position using proper arm and hand signals	
	(C3202.1-3) 12.1a	(C3202.4-6) 12.2a	(C3203.1/2) 12.3a		(C3203.3/4) 12.5a	
Cunner		,				
Loader						·
Driver				Maneuvers CEV to firing position (C1201.1/2) 12.4d		Selects hull down position and stops vehicle on most leve. ground available (C1201.3/4) 12.6d

	Tank Communder	Frepares sketch map of target area using military and map symbols	Selects reference point in coordination with gunner	s reference Azimuth indicator is in coordination zeroed on reference point	Reference point is Targets are identi-	Targets are identi- fied on range card	Target deflection is recorded
		(C3201.1) 13.1a	13.1a (C3201.2) 13.2a	(C3201.3) 13.3a	13.3a (C3201.4) 13.4a	13.4a (C3201.5) 13.5a	13,5a (C3201.6) 13.6c
C-29	Gunner		Selects reference point in coordination with T.C.	s reference Azimuth indicator is Reference point is in coordination zeroed on reference plotted on range ca.c.	2	Targets are identi- fied on range card	Target deflection is recorded
			(C2201.1) 13.2b	13.2b (C2201.2) 13.3b	(C2201,3) 13.4b	13.4b (C2201.4) 13.5b	13.5b (C2201.5) 13.6b
	Loader						
	Driver						

Tank Commander	Target range is	Quadrant elevation for gun is recorded	Quadrant elevation for searchlight is recorded	CEV's sector of responsibility is recorded	Marks range card for Announces "Gunner appropriate firing HEP, Tunnel (bridd position (primary, etc.)"	Announces "Gunner HEP, Tunnel (bridg. etc.)"
	(C3201.7) 13.7a	(C3201.8) 13.8a	(C3201.9) 13.9a	13.9a (C3201.10) 13.10a	13.11a	13.11a (C3301.2/3) 14.1.
C C	Tarket range is recorded	Quadrant elevation for gun is recorded	Quadrant elevation for searchlight is recorded	CEV's sector or responsibility is recorded	Marks range card for appropriate firing position (primary, alternate, secondary)	
	(C2201.6) 13.7b	(C2201,7) 13.8b	(C2201.8) 13.9b	13.9b (C2201.9) 13.10b	(C2201.10) 13.11b	
Loader						
Driver						

Tank Commander				s targ n from announ n to g		lec gu uad uad om
C-31	Ensures turret power is OM	Main gun switch power to ON	gun switch power Looks through sights to acquire target	(C3302,3) 33,4a	Traverses to an- nounced deflection & reads back deflection	(C3302.4/5) 33.6a
	(C2302.1) 33.1b	(C2302.1) 33.2b	33.3b		(C2302.2) 33.5b	
Loader	Sets maingun safety switch to "SAFE"	Opens breechblock and Returns operating checks that chamber handle on breechblis empty and clean; to locked position swabs breech if necessary	ock	ch- erts	Detaches and removes Sets main gun switch handle from round and to "Fire", positions closes breechblock self clear of recoil path, and announces "Up"	Sets main gun switch to "Fire", positions self clear of recoil path, and announces "Up"
	(C1103.1) 34.1c	(C1103.2) 34.2c	34.2c (C1103.3) 34.3c	(C1103.4) 32.4c	32.4c (C1103.5/6) 34.5c	(C1103.7/8) 34.6c
briver						

Tank Commander		Verifies elevation as read back by gunner. Orders "Fire at my command,","Fire:"			•	
		C3302.5/ C3301.7) 33.8a/35.1a	,			
Gunner	Sets quadrant eleva- tion on quadrant and zeros bubble, reads back quadrant eleva- tion		Announces, "On the way" and presses firing trigger	Announces "Misfire"	Yeeps muzzle trained Attempts to fire by on target and per- sonnel clear of TC hand control tri; muzzle and recoil ger, manual elevatic path	Attempts to fire by operating gunner and TC hand control trigger, manual elevatio firing button and th
	(C2302.3) 33.7b		(C2302.4) 35.2b	(C2101.1) 37.1b	37,1b (C2101.2/3) 38.1b	(C2101.4) 38.2b
Loader						
Driver						

					Orders "Fractiare CEV"	
Tank Commander			,		38.7a	
C-33	Waits 2 minutes after last attempt to fire, and then directs loader to unload round					Bails out
	(C2101.5) 38.3b	,				38.8b
Loader		Opens breechblock and If weapon is too hot attempts to unload waits additional 2 mound round round		If weapon is still too hot to unload, informs T.C.		Bails out
		(C1101.2) 38.4c	(C1101.3) 38.5c	(C1101.4) 38.6c		38.8c
Driver						Bails out
						ж ж

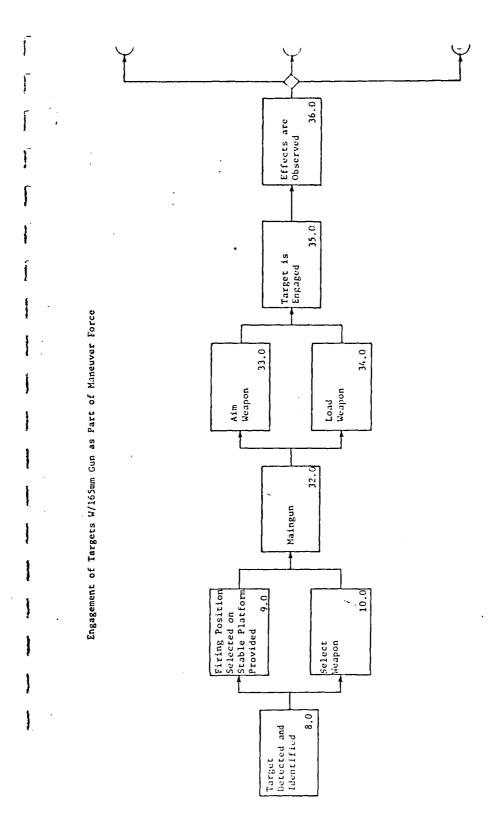
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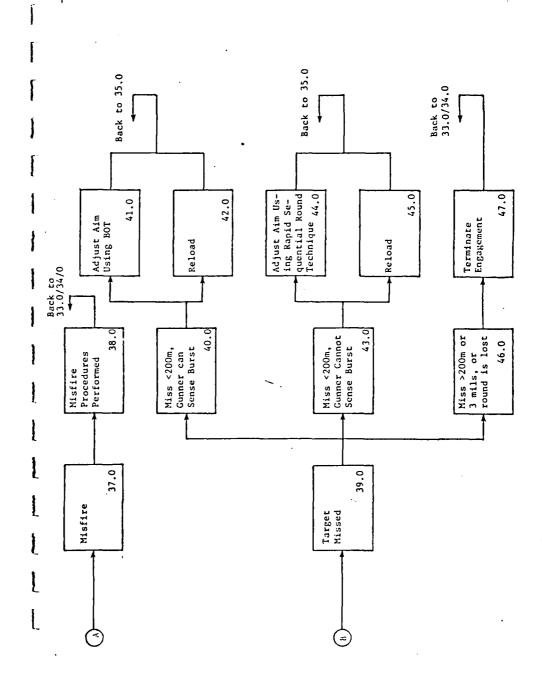
	Tank Commander						Announces, "Short, BOT" "Long, BOT"
				,			40.la
C-34	Gunner	If round does not "cook off" and after after weapon has cooled, has loader re-enter CEV and un-		Directs loader to place unfired round a safe distance from vehicles and all personnel		Insures that round is, Announces, properly marked, and "Short BOT" or EOD is notified for "Long BOT" disposal of round	Announces, "Short BOT" or "Long BOT"
		(C2101.8) 38.9b		(C2101.9) 38.11b	i	(C2101.10) 38.13b	(C2305.2) 40.1
	Loader		Unloads round		Places round where directed		
			(C1101.6) 38.10c		(C1101.7) 38.12c		
	Driver						

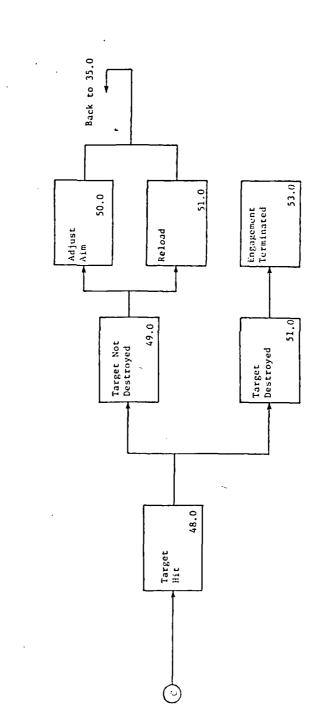
Tank Cormander			Announces "Short" or "Over"	Correct deflection by announcing direc- tion and mils (e.g., "Left-2" or "Right-3"		Correct elevation be announcing directionand meters (e.g., "brop 50" or "add 100")
			(C3304.2) 43.1a	(C3304.3) 44.1a		(C3304.4) 44.3a
Gunner	Uses location of bust Repositions gun so as Bof aiming point that BOT aiming poil is on target	Repositions gun so that BOT aiming point is on target			Receive change in de- flection in mils, repusition gun in deflection	
	(62305.2) 41.1b	(C2305.4) 41.2c			(C2306.1) 44.2b	
Loader	helving as described in 14.0 and announces			Reloads gun as described in 34.0 & announces "Up"		
	(C1103.1-8) 42.1-6c			(C1103.1-8) 45,1-6c		
Driver						

Tank Commander		Announces "Short", "Over," or "Lost"	Commands, "Cease fire"			Sees target is destroyed and commands, "Gease Fire"
		(C3304.2) 46.1a	(C3304.7) 47.1a			(C3304.7) 52.1a/53.
Gunner	Receive change in Announces "Short," tunge in meters if HEF "Over" or "Lost" reticle is being used a reposition gun so target is at new range in the metale of target is at new range in the reliable of target in the settle of target in target in the settle of target in the settle of target in the settle of target in target in the settle of target in	Amounces "Short" or "Lost		1 5	Adjusts aim so aiming point is undamaked porti target	
Forger		91.05		1.00	Neloads as described in 34.0 and announces "Up"	
Driver					(C1103.1-8) 51.1-6c	

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	ı		
		,	
		safety E	
		gun s SAFE	
		main ch to	
		Sets maingun safety switch to SAFE 53.2c	
ler			
Tank Congin Jer	Gunner	Loader	Driver
°C C		ר	Dr
	C+37		







Conditions: In a CEV as part of a tank unit, targets requiring engagement by 165mm gun are encountared. Targets are detected and identified by tank crews or troops. CEV is called up.

Tank	Detects and identified target		Announces, "Gunner HEP, Bunker (or other description of tar- get)"		•	
	8.1a		(C3301.1-2) 10.1a/30.1a	a		
Cunner	Detects and identifies	Describes target and position to T.C.		Ensures turret power is on	Sets maingun power switch to "ON"	Looks through sights to locate target
<u> </u>	a a	α τ		46 01 (1 10162)	46 OL (6 10162)	1. (6. (6. (9.69)
9000	betects and identifies target	Describes targe position to T.C		ret ring to		Sets maingun safety switch to SAFE
	α α	α		2. 01 (t 10.13)		7, 2, 17, 27, 12
	Detects and identifies	octects and identified Describes target and position to T.C.			Maneuvers vehicle into position, selects hull	/111-7:17
Driver				position or ges position by T.C.	down position on most level ground available positions CEV w/hull oriented to target	•
	8.14	8.24		C1201.3) 9.14	(C1201.1,4,5/ 9.2d C1201.1)	

Tank		Orders "Traverse "(right or left)		Orders "Steady"		Calls "ON"
Communder		(C3301.4) 33.2a	* .	(03301.4) 33.4a	1 .	(03301.4) 33.6a
Gunner			Traverses gun in direction ordered		Slows rate of traverse	
		,	(c2301.4) 33.3b		(C2301.5) 33.5h	
Loader	Opens breech fully, and checks that chamber is empty & free of debris	Returns operating handle to locked position	Removes round from ready rack, places projectile on breech-block rollers, inserts and scats round	Detaches and removes Closes the breach-handle from round block		Returns maingun saicty switch to FI: and stands clear of recoil path
	(C1103.2) 32.2c	(C1103.3) 34.3c	(C1103.4) 34.4c	(C1103.5) 34.5c	(C1103.6) 34.6c	(C1103.7) 34.7c
Driver						

7 100	Determines target range hv: Use of laser range-	Announces, "Range meters" (to		Orders, "Fire at my command, Fire"			
ler	Fants of binoculars &	eare			•		
	al .5	(C3301.5) 33.8a	,	(C3301.7) 35.1a			ł
Gunner	Stops traverse and searches for target when visually identi-		Elevates gun to ob- tain correct sight picture and alignment		Announces, "On the way", and presses trigger	Announces "Misfire"	
	fied announces "Iden- tified" 33.7b		(C2301.6) 33.9b		(C2301.7) 35.2b	(C2101.1) 37.1b	1b
	Anneunces, "Up"	Prepares to reload					
Loader							
	(C1103.8) 34.8c	(C1301.5) 34.9c					1
Driver							

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Tank Commander					•	
Gunner	Keeps muzzle trained Attemps to fire by on tarjet and personnel clear of TC hand control trifmuzzle and recoil ger, manual elevatifing button 6 the manual firing handl (C2101.2/3 38.1b (C2101.4) 38.2	De on	Waits 2 minutes after last attempt to fire, and then directs loader to unload round (C2101.5) 38.3b			
Loader				Opens breechblock and attempts to unload round (C1101.2) 38.4c	Opens breechblock and If weapon is too hot attempts to unload waits additional 2 minutes and unloads round (C1101.2) 38.4c (C1101.3) 38.5c	if weapon is still too hot to unload, informs T.C. (C1101.4) 38.6c
Driver						

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L	Tank Commander	Orders "Evacuate CEV"						
		38.7a		-	,			
C-45	Gunner		Bails out		if round does not "cook off" and after weapon has cooled, has loader re-enter CEV and unload round		Directs loader to place unfired round a safe distance from vehicle and all personnel	
			38 ,	38.8b	(C2101.8) 34.9b		(C2101.9) 38.11b	
L	Loader		Bails out			Unloads round		Places round where directed
			38	38.8c		(01101.6) 38.10c		(C1101.7) 38.12
	Driver		Bails out					
			38	38.84				:

	Tank Communder		Announces, "Short, BOT" "Long, BOT"			Announces, "Short" or "Over"		Correct deflection be unnouncing direction 5 mils (e.g., "Left-, or Right-3"
1			40.la	,		(C3304.2)	43.a	(C3304.3) 44.1a
C-46	2 auung	Insures that round is froperly marked, and fold is notified for disposal of round	Announces, "Short, BOT" or "Long, BOT"	Uses location of bust Expesitions gun so as BOT aiming point that bit aiming point is on target	Repositions gun so that bot aiming point is on tarket			
		(C2101.10) 38.13b	(C2305.2)	40.1b (C2305.2) 41.1b	(C2305.4) 41.2c			4
	Loader			Reloads as described in 34.0 and announces, "Up"			-	keloads gun as described in 34.0 & announces "Up"
				(C1103.1-8) 42.1-6c			-	(C1103.1-8) 45.1-6c
	Driver					,		

		Observes hit on target and searches for undamaged porti	49.1		
	47.1a				
Commands, "Cease fire"	(C3304.7)				
hort," lost"	46.1a	short", lost"	46.1b		
Announces "short," "over", or "lost"	(03304.2)	Announces, "over", or "	(C2306.2)		
	,	Receive change in Announces, "short", range in meters if HE "over", or "lost" reticle is being used 6 reposition gun so that center of target	is at new range in sight reticle (C2306,2/3) 44.4b	·	
rection by rection "Drop	44.3a				
Correct elevation by announcing direction 6 meters (e.g., "Drop 50" or "add 100")	(03304.4)		,		
		keceive change in de- flection in mils, reposition gun in deflection	(C23(16.1) 44.2b		
Tank Commander		ניִחטטהנ		Loader	Driver

				Sets maingun safuty switch to SAFE	53.2c		
Sees target is destroyed and commands, "Cease Fire"	(C3304.7) 52.1a/53.1d		٠,				
		Adjusts aim so that aiming point is on unduraged portion of target	50.1b	helouds as described in 34.0 and announces	(C11-3.1-8) 51.1-6c		
Tank		Gunner		Loader		Driver	

Engage Targets W/Searchlight From Predetermined Positions

Conditions: A CEV has been assigned the mission of guarding a particular sector of responsibility to deny enemy the use of transportation routes (bridges, tunnels, roads, etc.) or concealment (buildings, etc.)

Tank Commander	Considers sector of responsibility, observation and fields of fire, and cover & conceulment	Considers sector of Selects primary posi- Designates firing responsibility, obtion, alternate position to driver servation and fields tions, and secondary and designates route of fire, and cover & positions	Designates firing position to driver and designates route to firing position		When required, dismounts and guides vehicle into position using proper arm and hand signals	
	(C3202.1-3) 12.1a	(C3202.1-3) 12.1a (C3202.4-6) 12.2b	(C3203.1/2) 12.3a		(c3203.3/4) 12.5a	
G - 50						
Louder						
Driver				Maneuvers CEV to firing position		Selects hull down position and stops vehicle on most leve ground available

	Tank Commander	Prepares sketch map of target area using military and map symbols	Selects reference Azimuth indicator is point in coordination zeroed on reference with gunner point	Azimuth indicator is zeroed on reference point	Reference point is Targets are identiplotted on range card fited on range card	Targets are identi- fied on range card	Target deflection is recorded
		(C3201.1) 13.1a	(C3201.2) 13.2a	(c3201.3) 13.3a	13.3a (C3201.4) 13.4a	13,4a (C3201.5) 13.5a	(C3201.6) 13.6a
C-51	Gunner		Selects reference Azimuth indicator is point in coordination zeroed on reference with T.D.	Azimuth indicator is zeroed on reference point	Reference point is plotted on range card	Targets are identi- fied on range card	is recorded
ļ			(C2201.1), 13.2b	(C2201.2) 13.3b	(C22201.3) 13.4b	(C2201.4) 13.5b	(C2201.5) 13.6b
	Loader					-	
ļ							
	Driver						
	i						

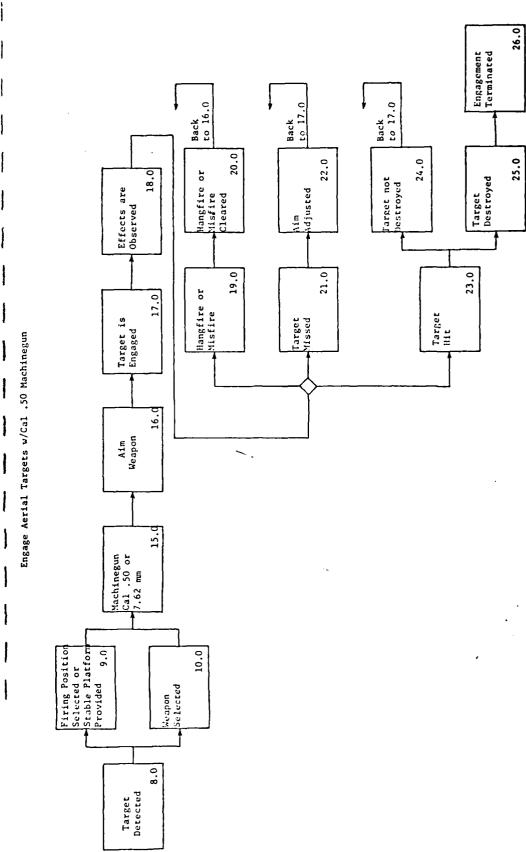
Tank Communder	Target range is recorded	Quadrant elevation for gun is recorded	Quadrant elevation for searchlight is recorded	CEV's sector of responsibility is recorded	Marks range card for Communicates w/ appropriate firing adjacent tank or CE position (primary, to determine target alternate, secondary) to be illuminated &	Communicates w/ adjacent tank or CEV to determine target to be illuminated &
	(C3201.7) 13.7a	'a (C3201.8) 13.8a	(C3201.9) 13.9a	(C3201.10) 13.10a	13,119	type of illumination required (C3301.1) 14.1a
Gunner	Turget range is recorded	Quadrant elevation for gun is recorded	Quadrant elevation for searchlight is recorded	CEV's sector of responsibility is recorded	Marks range card for appropriate firing position (primary, alternate, secondary)	
	(62201.6) 13.75	7b (C2201.7) / 13.8b	(C2201.8) 13.9h	(C2201.9) 13.10b	(62201.10) 13.115	
Loader						
Driver						

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				•		
Tank Commander	range card	Orders, "Gunner-White Light" or "Blacklight" depending on type required		Determines target de- flection from range card and announces deflection to gunner		Verifies deflection read back by gunner
	(C3303.1) 14.2a	(C3303.2) 14.3a/27.1d	,	(C3303.3) 28.2a		(C3303.5) 28.4a
Gunner			Turns turret power to ON		Traverses to announced deflection, reads back deflection	
		,	(C2303.1) 28.1a		(C2303.2) 28.3b	
Loader						
Driver						

			. ,		,
		Moves searchlight beam to center of target	(C2303.4) 29.3b		
and chlight	29.2a				
Orders "Fire" and turns on searchlight	(C3303.7)				
on rol box llumina-	29.1a				
Sets controls on AN/USS-1 control box for desired illumina- tion	(03303.6)				
rant ele-	28.7a				
Verifies quadrant ele- vation read back by gunner	(03303.5)				:
		Sets quadrant eleva- tion on quadrant, zeros bubble, reads back quadrant eleva- tion	(C2303.3)/ 28.6b		
ladrant om range ounces to	28.5a				
Determines quadrant elevation from range card and announces to gunner	(C3303.4)				
Tank Commander		Gunner		Loader	Driver
	İ	(54			

Tank Commander	Calls adjustment of searchlight as needed		When adjacent vehicle completes firing, commands, "Cease Fire and turns off searchight	•	
	(C3303.8) 30.1a		/ 31.1a		
Gunner		Adjusts aim of searchlight as directed by T.D.			
		(C2303.5) 30.2b			
Loader					
Driver					



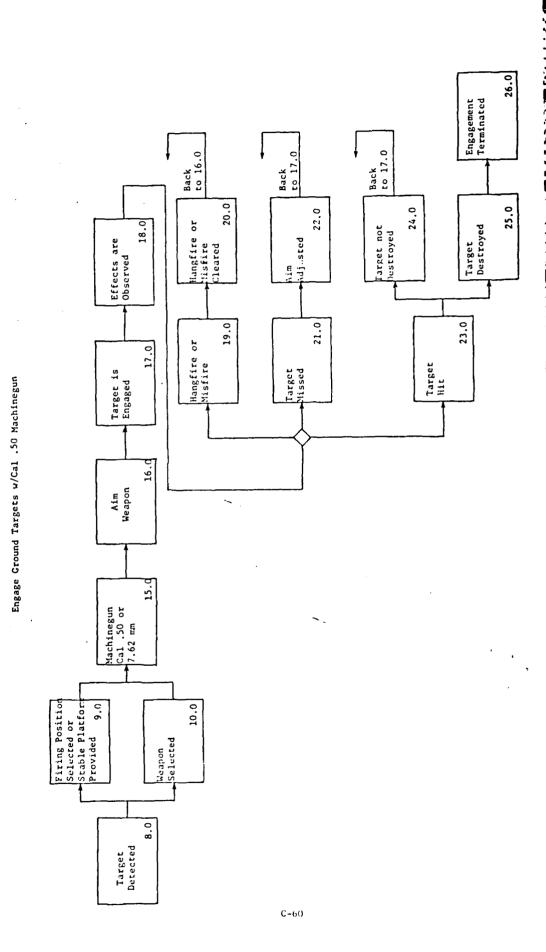
Special recovered recovers

Conditions: As crew in a CEV, unit or supported unit is under aerial attack, nearby air defense weapon engages target or target meets hostile criteria.

Tank hostile Commander						
_	Aerial target detected Announces and identified as "Caliber hostile	.05.	Sets cupola power ON, Aims above and in safety switch to FIRE front of target and and rate switch to fires a continuous burst until target files through cone of) f	If weapon is cold; keep weapon trained to target, wait 5 seconds for possible hangfire	Retract bolt and press trigger
	8.1a	(C3306.1) 10.1a/15.1a (C3306.1)	10.2a	fire (C3306.3) 16.1a/17.1a (C3102.1/2)	(C3102.1/2) 20.1a	(C3102.3) 20.2a
Avrial tar tected and as hostile	Arrial target de- tected and identified as hostile					
	8.15	,				
Aerial tar tected and Loader las hostile	Aerial target de- tected and identified as hostile					
-	8.1c					
Acrial target tected and target and and as hostile	Acrial target de- tected and identified as hostile	Stops CEV				
	8.14	9.14				

Tank Communde r	If weapon fails to fire, wait another 5 seconds and retract bolt	Open ammu	cover and remove Determine cause of stoppage, correct, reload, and continue engagement	OR If weapon is hot; Retract bolt and wait 5 seconds for press trigger possible hangfire	Retract bolt and press trigger	If gun does not fir open cover and unlo ammunition within 5 seconds
	(C3102.4) 20.3a	(03102.5)	20.4a (C3102,6) 20.5a	20.5a (C3102.7) 20.1a	20.1a (C3102.8) 20.2a	(C3102.9) 20.3a
Gunner						
Loader						
Driver						

			i
Continue to reposition and fire using Complete," and places cone of fire tech-safety switch to nique until target is SAFE ange destroyed or out of range (C3306.4) 22.1a/24.1a (C3306.5/6) 26.1a			
Continue to reposition and fire using Complete," and place cone of fire technique until target is SAFE adestroyed or out of case (C3306.4) 22.1a/24.1a (C3306.5/6) 26.1a			
after clearing, occurs, wait 5 clearing pro-seconds, unload gun s and troubleshoot 20.5a (C3102.12) 20.6a			
If second stoppage Occurs after clearing, occurs, wait 5 repeat clearing pro-seconds, unload gun cedures and troubleshoot (C3102.11) 20.5a (C3102.12) 20.6a			
If gun cannot be un- If seccloaded within 5 occurs seconds, let bolt go repeat forward, close cover cedures and wait 15 minutes before reloading (C3102.10)			
Tank Commander	C-259	Loader	Driver



Condition: As crew of a CEV, given a CEV ground targets appropriate for engagement with Cal .50 MG are encountered

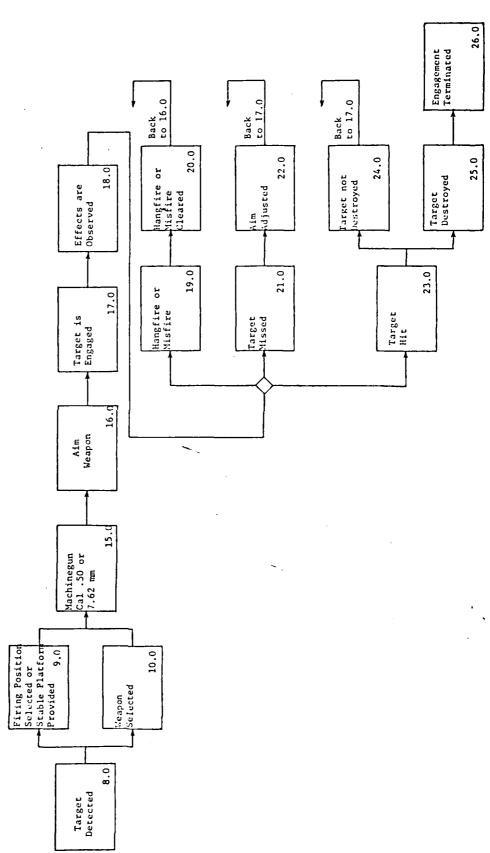
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Tank	Derects and identi- fies target	Announces "Cal .50"	Sets cupola power Estimates target switch to "ON", range and lays gun safety to "FIRE", and that range line in rate of fire switch MA region listoners.	6	Fires 10 to 15 round If weapon is cold; bursts in low rate the weapon trained to target in the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of the condition of	If weapon is cold; keep weapon trained to target, wait 5
	8.1a	(C3305.1) 10.1a/15.1a (C3305.2)	10.2a	no. e	(C3305.4) 17.1a	hangfire (C3102.1/2) 20.1a
	Detects and identi- lies target, informs					
Gunner	8.16	•				
Loader	Detects and identi- lies target, Informs I.C.					
	8.1c					
Driver	Detects and identifies a target. Informs T.C.		Slows or stops CEV depending on whether target is point or area type			
	8.14		9.14			

Tank Commander	Retract bolt and press	If weapon fails to fire, wait another 5 seconds and retract bolt	Open cover and remove ammunition	Determine cause of stoppage, correct, reload, and continue engagement	OR If weapon is hot; wait 5 seconds for possible hangfire	Retract bolt and press trigger
	(c3102.3) 20.2a	(C3102.4) 20.3a	/ (C3102.5) 20.4a	20.4a (C3102.6) 20.5a	20.5a (C3102.7) 20.1a	20.14 (63102,8) 20.2.
C-0-2						
Loader						
Driver						

Tank Commander	If gun does not fire, open cover and unload ammunition within 5 seconds	If gun does not fire, If gun cannot be un- If second stoppage open cover and unload loaded within 5 occurs after clearing ammunition within 5 seconds, let bolt go repeat clearing proseconds forward, close cover cedures and wait 15 minutes	If second stoppage If a third stoppage occurs after clearing, occurs, wait 5 repeat clearing pro-seconds, unload gun cedures and troubleshoot	If a third stoppage occurs, wait 5 seconds, unload gun and troubleshoot		Adjusts fire by "walking" tracers into target area
	(C3102.9) 20.3a	before reloading (C3102.10) 20.4a	(c3102.11) 20.5a	(C3102.12) 20.6a		(C3305.5) 22,2a
Gunner					Senses rounds, adjusts fire by calling "a little short", "a little to the right," etc.	
		~ .			22.1b	
Loader					Senses rounds, adjusts fire by calling "a little short", "a little to the right," etc.	
					22.1c	
Driver						

ł	1			ļ	
		-			
itch	7.2a				
fety swi					
Adjusts aim to con- Terminates engagement Places safety switch tinue destruction of by announcing "T.C. to "OFF". complete" when target is destroyed or out of range	(03305.7)				
gement F T.C. t target out	7.19				
res enga incing " i when royed or			-		
Terminate by annou complete is desti	24.1a (C3305.6)				
con-	24.1a				
aim to estruct					
Adjusts tinue d target					
Tank Commander					
Com					
					



Conditions: As crew of a CEV, given a CEV, a target requiring engagement by the 7.62mm M6 is encountered.

ax-Truck- "Driver, slow" or Calls, "steady" as gunner is aligned tion at target	,3,4,5) /15.1a/16.1a 9.1a (C3301.4) 16.3a (C3301.4) 16.5a	t power and Traverses turret . Slows rate of turret and says ratiches to right to right	15.1b (C2307.2) 16.6b	Checks that turret Checks that weapon Insures the 3-4 Announces "Up" ring is not obstructed is charged and ready inches of slack is 6 safety is in "Fire" between ammunition position One of the 3-4 Announces "Up" Announces "Up" Announces "Up" Announces "Up" Announces "Up"	15.1c (C1304.2) 15.2c (C1304.3) 15.3c (C1304.4) 15.4c	Slows vehicle to pro- Searches to detect vide a stable firing target and other platform, or maneuvers targets	Smoothly into illing!
"Gunner-Coax-Truck- 700-Traverse right"	(C2201.1,2,3,4,5) 8.1a/10.1a/15.1a/16.1a	Sets turret power and machinegun switches to "OH"	(C2307.1) 15.1b	ting is not obstruct	(C1304.1) 15.16		
Tank		C-66		. Loader		Driver	

Sights target using Mile	Tank Commander		Announces, "Fire at my command,"			•	
Sights target using Announces "on the way" Announces M12C telescope w/HEP and commences firing tructicle. Estimates and commences firing in 20-25 round bursts azimuth & elevation (C2307.3/4) 16.7b (C2307.5/6) 17.2b 19.1b Driver Driver							
(C2307.3/4) 16.7b ' (C2307.5/6) 17.2b 19.1b	Cenner C	Sights target using M32C relescope w/HEP reticle. Estimates range & adjusts azimuth & elevation		Announces 'on the way' and commences firing in 20-25 round bursts	Announces "Misfire"		
		(C2307.3/4) 16.7b	,	(C2307.5/6) 17.2b	19.16		
(C1107.1)	Loader					If gun is cold, waits 5 seconds	Pulls back charging handle and pulls trigger
Driver							(C1107.2) 20.2c
	Driver						

		ds,	
		If gun stops again, If gun cannot be un- waits 5 seconds and loaded within 5 seconds, 5 seconds closes cover, and points gun in safe direction for 15 minutes to cool (C1107.6)	
-			
		ills back charging indle and pulls igger 1107.5) 20.2c	
` .		on If gun is hot, waits 5 seconds (C1107.5) 20.1c	
		Loads gun and trys to fire manually. If gun scops again, waits 5 seconds, unloads and trouble—shoots (C1107.4) 20.4c	
		If gun stops again, Loads gun and trys to OR If gun is hot, Punits 5 seconds and fire manually. If waits 5 seconds from stops again, to "F", pulls charger waits 5 seconds, unhandle to rear 6 lets loads and trouble-punity go forward slow-shoots (C1107.4) 20.4c (C1107.5) 20.1c (C	
Tank Commander	Gunner	Loader	Driver

Tank Commander	Observes impact of rounds, adjusts fire by saying "up a little," "right a little," etc.		, .	Commands "Cease fire" when target is destroyed or out of range		
Canner		Alters aiming point based on commands of T.C. (C2307.7) 22.2b	Alters aiming point to continue destruc- tion of target		Stops firing. Turns machinegun switch to OFF (C2307 8) 26.2h	
Loader	Ensures that 3-4 inches of slack is maintained between the armunition box and the receiver (C1304.4) 22.1c	<u> </u>			itio	
Driver						

APPENDIX D

D-PAC COSTING GUIDE

D-PAC COSTING GUIDELINE

Introduction

The objective of the following costing guideline is to lead an analyst through a series of steps that will lead to an estimate of the cost of developing, acquiring, and operating a DORAC. Factors that are considered in estimating the total cost of the capability include the following:

- Facilities--Physical assets (buildings, land, etc.) required for the implementation and support of a DORAC system.
- 2. Equipment—Hardware directly associated with evaluation positions and their support.
- 3. Materials——Software (user materials, films, texts, computer programs, etc.) necessary for the conduct and support of DORAC evaluations.
- 4. Personnel--Evaluator and evaluatee costs incurred as a direct result of DORAC evaluation activities (e.g., salaries, travel, per diem, expendable supplies, etc.).

The first step in costing a DORAC is to specify the exact nature of each alternative; that is, to list the devices required, the planned number of evaluations per year, and support requirements in terms of operators, evaluators, and maintenance personnel; and so forth. Then, for each training device comprising part of an alternative and for the baseline alternative, the following series of steps is completed:

Step 1. Compute Anticipated Facility Load (AFL)

- a. Specify Annual Evaluation Frequency (AEF), the number of times each evaluatee must be evaluated annually using the device.
- b. For the device, specify the Evaluation Cycle Size (ECS), the number of evaluation positions that can be used simultaneously.
- c. Identify Organization Evaluation Unit Size (OEUS), the evaluatee group size (e.g., individual, squad, platoon, company, etc.) organic to the base organization (e.g., battalion, brigade, division, post, etc.) that most closely matches, without exceeding, the ECS.

- d. Specify the number of Evaluatees per Organization (E/O), the total number of personnel within the base organization that the evaluation is applicable to.
- e. Compute Organizational Evaluations (OE), the number of evaluation cycles required to process one base organization:

$$0E = \frac{E/O}{OEUS}.$$
 (A-1)

f. Compute Base Facility Load (BFL), the number of evaluations required to put all relevant base organizations (N $_{
m org}$) through one evaluation cycle:

$$BFL = N_{org} \times OE, \qquad (A-2)$$

where ${\rm N}_{\mbox{\scriptsize org}}$ is the number of base organizations scheduled to undergo evaluation.

g. Compute Estimated Facility Load (EFL), the expected number of evaluation cycles to process all base organizations on all evaluations:

$$EFL = BFL \times AEF. \tag{A-3}$$

h. Determine the expected number of re-evaluation (RE) cycles:

$$RE = PLE \times EFL,$$
 (A-4)

where PLE is the estimated percentage of lost evaluations.

 Finally, compute AFL, the expected number of evaluation cycles required to process all evaluatees, plus expected reevaluations:

$$AFL = RE + EFL. \tag{A-5}$$

Step 2. Compute Device Capability (DC)

- a. Determine Work Segment Length (WSL), the length of time in hours between work starts and stops during the work day.
- b. Specify the Number of Work Segments (NWS), the number of WSL periods per work day.

- c. Estimate Evaluation Cycle Length (ECL), the anticipated time in hours required to conduct one evaluation cycle using the device.
- d. Estimate Time Between Cycles (TBC), time in hours spent in orientation briefing, data collection, or critique.
- e. Compute the number of Evaluation Cycles per Day (EC/D) (rounded to nearest integer):

$$EC/D = \frac{WSI. \times SN}{ECL + TBC}. \tag{A-6}$$

f. Estimate Time Device Available (TDA), the number of training days per year the device is expected to be operational (round to nearest day):

$$TD\Lambda = PT\Lambda \times TDY,$$
 (A~7)

where PTA is the percentage of time the device is expected to be available,

and TDY is the number of training days per year.

g. Compute Device Capability (DC), the expected number of evaluation cycles per year that one device will accommodate:

$$DC = TDA \times (EC/D). \qquad (A-8)$$

Step 3. Compute the Number of Devices Required (NDR):

$$NDR = AFL/DC. (A-9)$$

Step 4. Determine Incremental Acquisition Cost of Device (ACD)

a. Compute Device Hardware Cost (DNC), the cost of acquiring the required number of devices (above the number required solely for training):

$$DHC = (NDR - NDOH) \times UCD, \qquad (A-10)$$

where NDOH is the number of devices on hand for training purposes,

and UCD is the unit cost of the device.

- b. Determine Direct Personnel Costs (DPC). DPC is the sum of the estimated number by proposed pay grade of operators, evaluators, and maintenance personnel multiplied by their salaries and benefits. Again, this is the <u>incremental</u> cost associated with providing personnel for purely evaluation purposes.
- c. Determine evaluation-related Personnel Training Costs (PTC):

$$PTC = CIT + EFT, (A-11)$$

where CIT is the cost of initial training for operators, evaluators, and maintainers;

and EFT is the expected cost of follow-on training (if any) plus the cost of training replacements for the initial cadre.

d. Compute Administrative Operating Costs (AOC):

$$AOC = EXS + TC, \qquad (A-12)$$

where EXS is the cost of data recording supplies, office supplies, facilities supplies, equipment supplies, utilities, ammunition, targets, and so forth associated with evaluation activities,

and TC is the cost of any required travel for evaluatees or cadre (again, evaluation related).

- e. Estimate Facilities Cost (FC). FC is the total cost of required acquisition, construction, or modification for device-related facilities used solely for evaluation.
- f. Estimate Annual Maintenance Cost (AMC), the annual cost of maintaining device-related facilities used solely for evaluation.
- g. Compute ACD:

$$ACD = DHC + (DPC + AOC + AMC) \times EY + PTC + FC, (A-13)$$

where EY is the expected life of the device.

Step 5. Determine Total Device Cost (TDC):

$$TDC = ACD + EEIR \times DHC \times EY,$$
 (A-14)

where EEIR is the expected replacement rate (percentage) per year for end item equipment used for evaluation purposes.

Step 6. Determine Total Estimated Cost of Alternative (TECA):

After the estimated cost of each device constituting a DORAC alternative is calculated, these costs are summed to produce the Total Estimated Cost of the Alternative (TECA):

$$TECA = \sum_{i=1}^{NDEV} TDC_{i}, \qquad (A-15)$$

where NDEV is the number of individual devices constituting DORAC alternative \underline{i} ,

and TDC, is the estimated cost of the i^{th} device (from $\Lambda^{-1}4$).

The application of (A-15) in determining the total estimated cost of alternative \underline{i} makes the assumption that all individual device costs are mutually exclusive; that is, no shared costs (e.g., common operators, evaluators, facilities, etc.) are involved. In the event that shared costs are involved, assign the overlapping costs to one device. In this manner, shared costs are only counted one time.